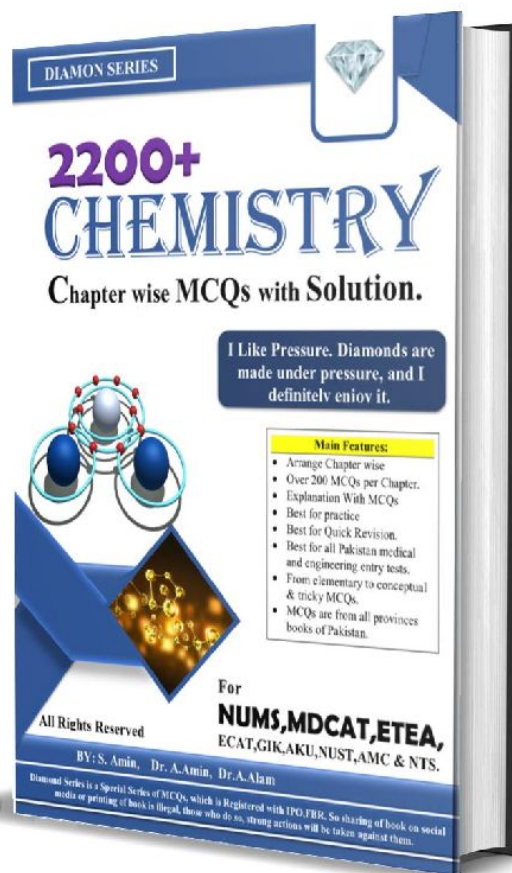
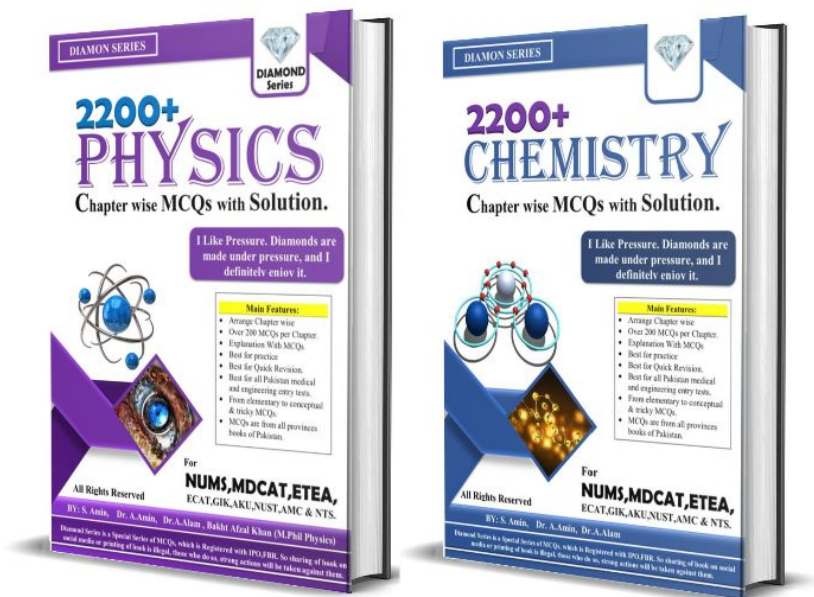
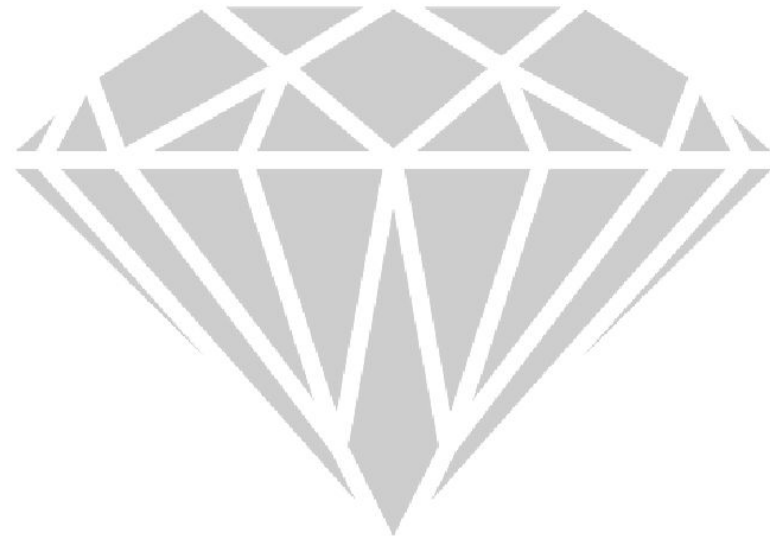




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Period of Use	SEPTEMBER, 1, 2005	Diamond Series
Application for Class	41	
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1)	Chap. 1 Stoichiometry		
2)	Phosphorous exists in nature as tetra atomic molecule. The number of atoms present one gram molecule of phosphorous are: A) 6.0323×10^{23} B) $2 \times 6.023 \times 10^{23}$ C) $3 \times 6.023 \times 10^2$ D) None of the above	D	
3)	Which compound with the given information has greater mass in Kg? A) $22.4 \text{ km}^3 \text{ N}_2$ at STP B) 2 mole of CO C) 6.02×10^{23} molecules of C_2H_4 D) All have equal mass	D	
4)	$2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$ Molecular mass of $\text{KClO}_3 = 122.5 \text{ g/mol}$ for the production of 33.6 dm^3 of O_2 at STP the mass of KClO_3 to be decomposed is: A) 245.0g B) 61.25g C) 122.5g D) 367.5g	C	
5)	The volume of CO_2 produced by heating $33.5 \text{ g Li}_2\text{CO}_3$ at room temperature and pressure is ($M_r \text{ Li}_2\text{CO}_3 = 67 \text{ g/mol}$): A) 22.4 dm^3 B) 12.0 dm^3 C) 11.2 dm^3 D) 24.0 dm^3	B	
6)	The number of gram atoms in 3g Hydrogen atoms is the same as the number of gram atoms in 48g of a) N B) C c) O D) O_2	C	
7)	Which of the following is a compound? (a) NH_3 (b) Air (c) Brass (d) O_2	A	Brass $\rightarrow$ Alloy (Made of Cu + Zn), $\text{O}_2 \rightarrow$ Molecule
8)	Na^+ is Iso-electronic with: (a) Mg (b) He	D	$\text{Na}^+ = 10 \text{ e}^-$, $\text{Ne} = 10 \text{ e}^- \rightarrow$ Both are Iso-electronic



	(c) Fe (d) Ne		
9)	Which of the following pairs have same electronic structure? (a) Ar & Cl ⁻ (b) Ca & Ar (c) Mg & Na ⁺ (d) Ag & Sn	A	Ar & Cl ⁻ are Iso-electronic between both have 18 e.
10)	The anion size are larger than its atomic size because, (a) The addition of electron occupies more space (b) It increases the effective nuclear charge (c) The repulsion between electrons increases with the addition of electron (d) The attraction between electrons and the nucleus increases	C	
11)	Natural chlorine occurs as a mixture of isotopes if a mixture contains 75% Cl ³⁵ and 25% Cl ³⁷ what will be its correct atomic weight? (a) 35.50 (b) 34.50 (c) 72.00 (d) 70.00	A	Amount of Cl ³⁵ = $\frac{75}{100} = 0.75$, Amount of Cl ³⁷ = $\frac{25}{100} = 0.25$ Average atomic weight = (Amount) (At: Mass of 1 st isotope) + (Amount) (At mass of 2 nd isotope) = (0.75) (35) + (0.25)(37) = 26.25 + 9.25 = 35.5
12)	How many hydrogen atoms are present in one mole of water? (a) 6.02×10^{23} atoms (b) 1.806×10^{24} atoms (c) 1.204×10^{24} atoms (d) 3.01×10^{23} atoms	C	To find # of Atom = $n \times N_A \times \# \text{ of Atom in formula}$ = $1 \times 6.02 \times 10^{23} \times 2$ = $12.04 \times 10^{23} = 1.2 \times 10^{24}$ atoms
13)	The number of oxygen in 0.5 mole of Al ₂ (CO ₃) ₃ is (a) 4.5×10^{23} (b) 3.6×10^{24} (c) 2.7×10^{24} (d) 9.0×10^{23}	C	# of Atoms = $n \times N_A \times \# \text{ of Atoms in formula}$ $0.5 \times 6.02 \times 10^{23} \times 9 = 27.09 \times 10^{23} \Rightarrow 2.7 \times 10^{24}$ atoms
14)	A sample containing aluminum weighing 10.0g yielded 2.0g of aluminum sulphide. What is the percentage of aluminum (atomic mass = 27.0) in the sample? Sulphur (atomic mass = 32.0)	B	Formula of Aluminum Sulphide = Al ₂ S ₃ %age of an Element = $\frac{\text{Given Mass of Al} \times \text{Af: Mass}}{\text{Given Mass of organic Compound} \times \frac{\# \text{ of atoms} \times \text{M. Mass of Al}}{\text{M. Mass of organic Compound}}} \times 100 =$



	(a) $\frac{2.0 \times 100}{10.0}$ (b) $\frac{2.0}{10.0} \times \frac{2 \times 27}{150} \times 100$ (c) $\frac{2.0}{10.0} \times \frac{27}{1500} \times 100$ (d) $\frac{2.0}{10.0} \times \frac{150}{3 \times 27} \times 100$		
15)	The sample of a compound contains 0.100g of hydrogen and 4.20g of nitrogen. The simplest formula for the compound is... (a) HN_2 (b) NH_3 (c) HN_3 (d) NH_2	B	
16)	Calculate the volume occupied by 2.8g of nitrogen gas at STP. (a) 22.4 dm³(b) 2.24 dm³ (c) 4.48 dm³(d) 44.8 dm³	B	$n = \frac{V}{V_m} \Rightarrow v = n \times V_m$ $n = \frac{m}{M} = \frac{2.8}{28} = 0.1$ $V = 0.1 \times 22.4 = 2.24 \text{ Dm}^3$
17)	How many atoms are contained in one mole of $\text{Ca}(\text{OH})_2$ (a) $5 \times 6.02 \times 10^{23}$ atoms (b) $30 \times 6.02 \times 10^{23}$ atoms (c) $3 \times 6.02 \times 10^{23}$ atoms (d) $6 \times 6.02 \times 10^{23}$ atoms	A	# of Atoms = $n \times N_A \times$ # of Atoms in formula $= 1 \times 6.022 \times 10^{23} \times 5$ $= (5 \times 6.02 \times 10^{23}) \text{ Atoms}$
18)	A gas at STP contains only 6.023×10^{23} atoms and is monatomic it will occupy. (a) 1.2L (b) 22.4L (c) 30.5L (d) 44.8L	B	$22.4 \text{ dm}^3 = 22.4 \text{ L} = 6.023 \times 10^{23} \text{ atoms}$
19)	How many grams of water are produced in burning 2.24dm³ of hydrogen at STP? (a) 180g (b) 81.g (c) 1.8g (d) 0.18g	C	$2\text{H}_2 + \text{O}_2 \Rightarrow 2\text{H}_2\text{O}$ 2 mole 1 Mole 2 Mole $n = \frac{V}{V_m} = \frac{2.24}{22.4} = 0.1 \text{ Moles}$ $n = \frac{m}{M}, m = n \times M = 0.1 \times 18 = 1.89$
20)	One mole is the amount of substance which contains as many elementary entities as contained in: (a) 0.12 kg of ${}^{12}_6\text{C}$ (b) 1.2 kg of ${}^{12}_6\text{C}$ atom	C	One mole of C-12 = 12 g = (0.012 Kg)



	(c) 0.012 kg of ${}_6\text{C}^{12}$ atom (d) 0.12 kg of ${}_8\text{O}^{16}$		
21)	Which one of the following contains the greatest number of atoms: (a) 4g of Hydrogen (b) 4g of magnesium (c) 71 g of chlorine (d) 127g of iodine	A	For H ₂ = $n = \frac{m}{M} = \frac{4}{1.008} = 4 \text{ Mole}$ For = Mg = $n = \frac{m}{M} = \frac{4}{24} = 0.16$
22)	A sample of carbon-12 has a mass of 3.0 g. which expression gives the number of atoms in the sample? (N_A is the symbol for the Avogadro constant. (a) $0.0030N_A$ (b) 0.25 N_A (c) $3.0 N_A$ (d) $4.0 N_A$	B	$N = n \times N_A = n \times \frac{m}{M} = \frac{3}{12} = 0.25$ $N = 0.25 \times N_A$
23)	Four moles of electrons ($4 \times 6.02 \times 10^{23}$ electrons) would electroplate how many grams of silver from a silver nitrate solution? (a) 216 (b) 324 (c) 432 (d) 540	A	$\text{AgNO}_3 \longrightarrow \text{Ag}^{+3} + \text{NO}_3^{-3}$ (Ag = 108) $n = \frac{m}{M}, m = n \times M$ $m = 4 \times 108 = 432$
24)	How many molecules are present in 0.20 g of Hydrogen gas? (a) $\frac{0.20}{1.008} \times 6.02 \times 10^{23}$ (b) 0.20×2.016 (c) $\frac{0.20}{2.016} \times 6.02 \times 10^{23}$ (d) $\frac{1.008}{0.70} \times 6.02 \times 10^{23}$	C	For number of particles = $N = n \times N_A$ $n = \frac{m}{M} = \frac{0.2}{2.016}$ $N = \frac{0.2}{2.016} \times 6.02 \times 10^{23}$
25)	1 amu is equal to 1.661×10^{-24} g, then 1.0 g will be equal to: (a) 6.022×10^{23} amu (b) 6.022×10^{-23} amu (c) 6.022×10^{-24} amu (d) 6.022×10^{24} amu	A	
26)	Calculate the number of moles of NaCl in 75.0g of table salt (a) 0.643 (b) 0.779 (c) 28.0 (d) 1.28	D	$n = \frac{m}{M} = \frac{75}{58} = 1.29$
27)	If water samples are taken from sea, river, clouds, lakes or snow, they will be found to contain hydrogen	C	



and oxygen in the ratio of 1:8 by weight. This indicates the law of

- (a) Definite proportion (b) Multiple proportion
(c) Reciprocal proportion (d) None of the above

28)	10 L of Cl_2 gas reacts with 40L of H_2 gas under same conditions of temperature and pressure. How much volume of HCL should be produced? (a) 40L (b) 30L (c) 20L (d) 10L	C
29)	If 28.0g nitrogen gas is reacted with 8.0g of hydrogen gas to form Ammonia, the limiting reactant among the two will be: (a) N_2 (b) H_2 (c) Both a & b (d) None of these	A
30)	Choose the correct Statement: (a)The most direct and accurate method for determining atomic masses uses mass spectroscopy. (b)The indirect but accurate method for determining molecular masses uses mass spectroscopy. (c)Collision between the electrons and the atoms produces negative ions by absorption of electrons by atoms or molecules. (d)The first application of the mass spectroscopy was the demonstration to detect various isotopes of argon.	D
31)	Choose the correct relation about the percent yield. It is equal to: a) $\frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$ b) $\frac{\text{Theoretical yield}}{\text{Actual yield}} \times 100$	A



$$\text{c) } \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 10^6 \quad \text{d) } \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 10^3$$

32)	What is the number of hydrogen atoms in 5 moles of water? A) 3.0115×10^{24} B) 6.023×10^{24} C) 6.023×10^{23} D) 5.0×10^{23}	B	# of Atoms = $n \times N_A \times \# \text{ of Atoms in formula (Atomicity)} = 5 \times 6.022 \times 10^{23} \times 2 = \mathbf{6.023 \times 10^{24}}$
33)	$\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$. In the above reaction the limiting reagent is: A) N_2 B) H_2 C) Ammonia D) None of the above	D	
34)	Theoretical yield is always: A) Less than practical yield. B) Greater than actual yield C) Both are equal D) None of the above	B	
35)	Which of the following is iso – electronic pair? A) Ne and Na and Mg^{+2} B) Ne C) Al and c D) Ar and Ca	B	
36)	Consider the following reaction involved in the manufacture of Urea: $\text{CO}_2 + 2\text{NH}_3 \rightarrow \text{NH}_2\text{COONH}_4$ If 22.0g of CO_2 react with 34 g of ammonia to form ammonium carbamate, the reaction is taken as irreversible and go to completion. Identify the limiting reagent and the amount of carbamate for Med : (a) CO_2 , 78g (b) NH_3 , 78g (c) CO_2 , 39g (d) NH_3 , 39g	C	
37)	A ring contains 1.2gram of diamond, the number of carbon atoms in the ring are: (a) $N_A/10$ (b) N_A (c) $N_A/2$ (d) $1.2 N_A$	A	
38)	Cylinder "A" contain 4.6 grams of $\text{C}_2\text{H}_5\text{OH}$ and cylinder "B" has 3		



grams C_2H_6 :
(a) Both cylinder A and B have equal number of molecules
(b) Cylinder A has greater number of molecules than cylinder B
(c) Both cylinders have the equal number of hydrogen atoms

- 39) DDT is used as insecticides its molar mass is 354.5g/mol when DDT was analysed by chemist he found that it contained 47.4% carbon. How many carbon atoms are there in DDT molecule:
(a) 10 (b) 12
(c) 14 (d) 16

- 40) Which of the following species have the same number of neutron and electron as in C-14: [2016-127 En
(a) $^{17}_7N^{=1}$ (b) $^{19}_9F^{+1}$
(c) $^{16}_8O^{+2}$ (d) $^{29}_{14}S$

- 41) 60 a.m.u of C-12 contain carton: atoms
(a) 60 (b) $60 \times 6.02 \times 10^{23}$
(c) $5 \times 6.02 \times 10^{23}$ (d) 5

- 42) Balance the given equation by using the suitable coefficients from the following sets:
 $FeS_2 + O_2 \rightarrow Fe_2O_3 + SO_2$
(a) 4:11:2:8 (b) 1:10:2:8
(c) 6:5:3:7 (d) 2:11:4:8

- 43) $2XeF_6 + SiO_2 \rightarrow 2XeOF_4 + SiF_4$ A
Consider the above chemical reaction. If 122.6 g of XeF_6 reacts with 60 g of SiO_2 to form the products. Select the limiting reagent and amount of SiF_4 for Med: (XeF_6 245.3 amu, SiO_2 = 60 amu, SiF_4 = 104 amu)
(a) XeF_6 , 26 g (b) SiO_2 , 26 g



	(c) XeF ₆ , 52 g 52 g	(d) SiO ₂ , 52 g	
44)	How many oxygen atoms are present in 278g of Hydrated Ferrous Sulphate? (FeSO ₄ ·7H ₂ O = 278) (a) $6.023 \times 10^{23} \times 10^{24}$ (c) $2.408 \times 10^{23} \times 10^{22}$	(b) 6.525 (d) 6.023	B
45)	Select the reaction when the supply of air is very limited. (a) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{heat}$ (b) $2\text{CH}_4 + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 4\text{H}_2\text{O} + \text{heat}$ (c) $\text{CH}_3 - \text{CH}_3 + 7\text{O}_2 \rightarrow \text{CO}_2 + 6\text{H}_2\text{O} + \text{heat}$ (d) $2\text{CH}_4 + 2\text{O}_2 \rightarrow 2\text{C} + 4\text{H}_2\text{O} + \text{heat}$	D I	
46)	$2\text{XeF}_6 + \text{SiO}_2 \rightarrow 2\text{XeOF}_4 + \text{SiF}_4$ Consider the above chemical reaction. If 122.6 g of XeF ₆ reacts with 60 g of SiO ₂ to form the products. Select the limiting reagent and amount of SiF ₄ formed: (XeF ₆ 245.3 amu, SiO ₂ = 60 amu, SiF ₄ = 104 amu) (a) XeF ₆ , 26 g (c) XeF ₆ , 52 g 26 g 52 g	(b) SiO ₂ , (d) SiO ₂ , 26 g 52 g	A
47)	How many oxygen atoms are present in 278g of Hydrated Ferrous Sulphate? (FeSO ₄ ·7H ₂ O = 278 any) (a) 6.023×10^{23} (c) 2.408×10^{23}	(b) 6.525×10^{24} (d) 6.023×10^{22}	B
48)	Which one is experimental equation? a. Rate equation	D Reate equation or rate expression is experimental while stoichiometric equation is theoretical.	



	b. Rate expression c. Both a and b d. Stoichiometric equation		
49)	Which statement is correct about stoichiometric calculations? a. Reactants are completely converted into products b. No side reactions take place c. Both a and b are correct d. None of these	D	25g of iodine $25\text{g atom of oxygen} = 25 \times 16 = 400\text{g}$ $25\text{g mole of water} = 450\text{g}$ $25\text{g mole of nitrogen} = 700\text{g}$ So, nitrogen has maximum mass
50)	Which pair of characteristics is shown by the mass spectra of propanone and propanal? MASS of Molecular ion Fragmentation a. Different Different b. Different same c. Same different d. Same Same	C	In mass spectra fragmentation occurs which formed the molecular ion. Mass of molecular ion will be same because they are functional group isomers but their fragmentation will be different because of different functional groups.
51)	Which one represents a mole? a. 6.02×10^{23} atoms b. 24 litres of oxygen gas at RTP c. 1g atom of Na d. All of these	D	One mole contains 6.62×10^{23} atoms/ions/molecules etc. 22.4 dm^3 at STP = 24 dm^3 at RTP.
52)	Which one of the following has maximum mass? a. 2g molecules of oxygen b. 1g mole of H_2O c. 2g atoms of nitrogen d. 1g formula of CaCO_3	D	$2\text{g atom of O}_2 = 2\text{ mole} = 64\text{ gram/mol}$ $1\text{ mole of H}_2\text{O} = 18\text{ gram/mol}$ $2\text{g atom of N}_2 = 2\text{ mole} = 56\text{ gram/mol}$ $1\text{g formula of CaCO}_3 = 1\text{ mole} = 100\text{ gram/mol}$
53)	Which one of the following contains maximum number of molecules? a. 1 mole of CH_4 b. 17g of NH_3 c. 56g of CO d. 180g of glucose	C	As 1 mole of a compound has N_A particles (molecules). Here we have two moles of CO which has maximum number of molecules = $2 \times N_A$
54)	Which one represents a mole? a. 1g of molecule of O_2 b. 1g atomic mass of N_2 c. 1g formula of NaCl	D	G atom = gram molecule = g formula = mole



	d. All of them		
55)	The number of atoms present in 1 mole of H_2SO_4 : a. $7 \times N_A$ b. $8 \times N_A$ c. N_A d. $10 \times N_A$	A	No of atoms = mole $\times$ atomicity $\times N_A$ $= 7 N_A$
56)	A unit which represent 6.023×10^{23} particles is called: a. Mole b. 1-gram ionic mass c. 1 gram molecule of nitrogen d. All of these	D	Definition of Avogadro's number
57)	How many moles of carbon atoms are present in 180g of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$)? a. 6 moles b. 12 moles c. N_A moles d. 24 moles	A	180 g of glucose = 1 mole No of mole of C in $\text{C}_6\text{H}_{12}\text{O}_6 = n \times \text{C atom in glucose} = 1 \text{ mole} \times 6 = 6 \text{ mole}$
58)	How many moles are there in 60g of NaOH? a. 1.5 mol b. 2 mol c. 4 mol d. 8 mol	A	Moles in 60g of NaOH = $60\text{g} / 40 = 1.5$
59)	If 15g of sulphur are burnt, what volume of SO_2 is produced at STP? a. 10.51 dm^3 b. 20 dm^3 c. 30 dm^3 d. 100 dm^3	A	$\text{S}(1\text{mol}) + \text{O}_2(1\text{mol}) \rightarrow \text{SO}_2(1\text{mol})$ Mole of sulphur = $\frac{15\text{g}}{32} = 0.468 \text{ mole}$ 1 mole of sulphur when burnt = 1 mole of SO_2 produced X mole of sulphur when burnt = 0.462 mole of SO_2 produced X = 0.468 Now convert into volume Volume of $\text{SO}_2 = 0.468 \times 22.4 \text{ dm}^3 = 10.51 \text{ dm}^3$
60)	The largest number of molecules are present in: a. 44g CO_2 b. 98g H_2SO_4 c. 36g H_2O d. 180g $\text{C}_6\text{H}_{12}\text{O}_6$	C	44g of $\text{CO}_2 = N_A$ molecules 98g $\text{H}_2\text{SO}_4 = N_A$ molecules No. of molecules in 36g of $\text{H}_2\text{O} = 2 \times N_A$ molecules Number of molecules in 180g of $\text{C}_6\text{H}_{12}\text{O}_6 = N_A$ molecules



- 61) Which of the following has C maximum mass? These are conditions for the stoichiometric calculations
- 25g of iodine
 - 25g atom of oxygen
 - 25g mole of water
 - 25g mole of nitrogen as
- 62) The Avogadro's number of atom or molecules of formula units of substance is called its: C One mole of any substance contains 6.022×10^{23} particles
- Molecular weight
 - Molecular mass
 - Mole
 - None of these
- 63) The relative atomic mass of oxygen is 16amu. What is the mass of 2 mole of oxygen gas? A The relative atomic mass of oxygen = 16 amu
Convert into mole thus 1 mole oxygen atom = 16g/mol
So, mass of 1 mole of oxygen gas = 32 g
Mass of two mole of oxygen gas = $2 \times 32 \text{ g} = 64\text{g}$
- 64g
 - 32g
 - 100g
 - 71g
- 64) From 2 moles of KClO_3 how many liters of O_2 can be produced at STP by decomposition of all the KClO_3 ? D As $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
2 mole KClO_3 produce 3 mole O_2
Volume of O_2 at STP = moles $\times$ molar volume
 $= 3 \times 22.4 \text{ dm}^3 = 67.2 \text{ L}$
- 11.2 L
 - 22.4 L
 - 33.6 L
 - 67.2 L
- 65) On heating 0.2 mole of $\text{CaSO}_4 \cdot x\text{H}_2\text{O}$ loses 0.1 mole of water. What could be the formula of the compound? C 0.2 moles CaSO_4 on heating = 0.1 mole H_2O produced
1 mole CaSO_4 on heating = $x(\text{H}_2\text{O})$ produced)
 $X = \frac{0.1 \times 1}{0.2} = 0.5$ or $1/2$
Thus $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
- $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
 - $\text{CaSO}_4 \cdot \text{H}_2\text{O}$
 - $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
 - None of these
- 66) Which one has the maximum mass? B 98 g of H_2SO_4
5 g atom of iodine = 634.5 g
3g molecule of SO_2 = 192 g
2g formula of CaCO_3 = 200 g
So 5 g of iodine has maximum mass
- 98g of H_2SO_4
 - 5g atom of iodine
 - 3g molecule of SO_2
 - 2g formula of CaCO_3
- 67) The number of atoms present in 32 amu of oxygen gas: A 1 oxygen atom = 16 amu
X (oxygen atom) = 32 amu



- a. 2
b. 6.023×10^{23}
c. 4
d. 8

$$X = \frac{32}{16} = 2 \text{ oxygen atom}$$

68)	At 4°C the density of water is 1 g/cm ³ , what is the mass of 2 dm ³ of water?	B	$1 \text{ g/cm}^3 = 1000 \text{ g/dm}^3$ $V = 2 \text{ dm}^3$ $D = \frac{m}{V} \Rightarrow m = d \times v \Rightarrow m = 1000 \text{ g/dm}^3 \times 2 \text{ dm}^3 = 2000 \text{ g}$
69)	What volume of 0.10 mol dm ⁻³ aqueous silver nitrate reacts with 20 cm ³ of 0.20 mol dm ⁻³ barium chloride?	D	$\text{As } 2\text{AgNO}_3 + \text{BaCl}_2 \rightarrow 2\text{AgCl} + \text{Ba(NO}_3)_2$ $\frac{m_1 v_1}{n_1} = \frac{m_2 v_2}{n_2} \Rightarrow \frac{0.10 \times v_1}{2} = \frac{0.2 \times 20}{1} \Rightarrow v_1 = 80 \text{ cm}^3$
70)	Which one is the molar volume of the gas at STP?	B	It has been found experimentally that one mole of any gas at STP occupies 22.4 dm ³ volume
71)	Which of the following conditions of temperature and pressure are the standard conditions (STP)?	D	STP means 0°C and 1 atm pressure 273 K and 14.7 PSI, 32 °F and 760 torr, 0°C = 273 K = 32°F 1 atm = 14.7 PSI = 760 torr
72)	Which one of the following compound contains the highest percentage by mass of nitrogen?	B	$\% \text{ of elements} = \frac{\text{no of atoms} \times \text{atomic mass of elements}}{\text{molecular mass of the compound}} \times 100$ Percentage by mass of nitrogen in $\text{N}_2\text{H}_4 = \frac{28}{32} \times 100 = 87.5\%$ Which is the highest one
73)	The molecular mass of haemoglobin is 67200 g/ mol. If 0.33% of iron is present in haemoglobin, how many iron atoms	A	Let x is the number of Iron atoms using the percent by mass formula we can find x



are present in one molecule of haemoglobin?

- a. 4
- b. 3
- c. 1
- d. 8

$$0.33 = \frac{55.85 \times x}{67200} \times 100 \Rightarrow x = 4 \text{ number of iron atoms}$$

74)	DDT is an insecticide, it contains 47.39% carbon by mass, its molecular mass is 354.5 g mol^{-1} , how many carbon atoms are present in one molecule of DDT?	A	$\% \text{ age of mass} = \frac{\text{mass of carbon} \times \text{no of atoms}}{\text{molar mass of DDT}} \times 100$ $\text{No of atoms} = \frac{47.39 \times 354.5}{12 \times 100} \times 100 = 14$
75)	In the reaction, $\text{N}_2 + 3\text{H}_2 = 2\text{NH}_3$ The limiting reagent is:	D	In a balanced and reversible reaction there is no concept of limiting and excess reagent.
76)	For which one of the following the limiting reagent is applicable?	A	The concept of limiting and excess reagent is applicable for irreversible reaction.
77)	4 moles of sulphur reacts with 20 moles of fluorine to form sulphur hexa fluoride, the excess reagent is:	B	$\text{S} + 3\text{F}_2 \rightarrow \text{SF}_6$ 1 mole of S react with = 3 mole of F_2 , (From balanced reaction) 4 moles of S react with = 20 moles of F_2 $\frac{\text{mole of S}}{\text{stoichiometric Ratio}} : \frac{\text{mole of F}}{\text{stoichiometric Ratio}} \Rightarrow \frac{4}{1} : \frac{20}{3}$ Stoichiometric ratio 4: 6.66 SO_2 , fluorine is excess reagent.
78)	If 49g of H_2SO_4 react with 80g of NaOH; how much reactant will be left over after the reaction is complete?	C	H_2SO_4 is a limiting reagent which control the product formation. From balance equation $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ 80g NaOH react with = 98 g of H_2SO_4 (from balance equation) Now for 49g of H_2SO_4 40g NaOH is



	d. 60g NaOH		needed out of 80g 40g of NaOH react with = 49g of H_2SO_4 So the NaOH consumed is $80\text{g} - 40\text{g} = 40\text{g}$ As NaOH is an excess reagent Mass of excess reagent left = total mass of excess reagent – mass consumed $80 - 40 = 40\text{g}$
79)	The efficiency of a reaction can be checked by knowing: a. % yield b. Theoretical yield c. Expected yield d. All of them	A	Efficiency of a reaction can be checked by % yield.
80)	The % yield of a certain reaction is 95, the reaction is considered as: a. Excellent b. Good c. Very good d. All of them	A	Reaction that yield above 90% are considered excellent.
81)	The actual yield is always less than the theoretical yield due to a. Side reaction b. Mechanical loss c. Reversible nature d. All of them	D	Actual yield is less than theoretical yield due to i. Side reaction, ii. Mechanical loss iii. Reversible nature, and iv. Impurity
82)	Theoretical yield is always less than the actual yield because: a. Some product is lost in the experiment b. Reversible reaction may occur c. Errors are made in weighing reactant or the products d. The given statement is not correct	D	Theoretical yield is always greater than actual yield
83)	200 dm ³ of CO is burnt completely according to the reaction. $2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$ What volume of O ₂ will be required? a. 100 dm ³	A	According to the balanced chemical equation 2 volumes of CO combine with one volume of O ₂ to produce two volumes of CO ₂ if 200dm ³ of CO is used then 100 dm ³ of O ₂ will be required.



- b. 50 dm^3
 c. 60 dm^3
 d. 70 dm^3

84)	The pressure of vapours when sent to the ionization chamber in mass spectrometer is (a) 10^{-5} to 10^{-6} torr (c) 10^{-7} to 10^{-8} torr (b) 10^{-6} to 10^{-7} torr (d) 10^{-3} to 10^{-4} torr	(b) Low pressure is maintained in ionization chamber so that collisions of these ions may not occur.
85)	9.8 grams of aqueous solution of H_2SO_4 contains moles of H^+ ions	(b) $9.8 \text{ g H}_2\text{SO}_4 = 0.1 \text{ mole H}_2\text{SO}_4$ 1 mole H_2SO_4 produces 2 moles H^+ ions. Therefore 0.1 mole H_2SO_4 produces 0.2 mole H^+
86)	One mole of $\text{C}_2\text{H}_5\text{OH}$ contains no of oxygen atoms (a) 6.02×10^{23} (b) 1.81×10^{24} (c) 3.61×10^{24} (d) 6.02×10^{24}	(a) 1 mole $\text{C}_2\text{H}_5\text{OH}$ contains O = 1 mole Therefore 1 mole oxygen atoms = 6.02×10^{23} O-atoms
87)	A beaker contains 9 grams of water. The number of H atoms is (a) 6.02×10^{23} (c) 6.02×10^{24} (b) 3.01×10^{23} (d) 3.01×10^{24}	(a) $9 \text{ grams} = 0.5 \text{ mole H}_2\text{O}$ 1 mole H_2O contains H-atoms = $2 \times 6.02 \times 10^{23}$ 0.5 mole H_2O contains H-atoms = 6.02×10^{23}
88)	Molecular formula is determined from empirical formulas because (a) Molecular formula $\times$ empirical formula = n (b) Molecular formula = n $\times$ empirical formula (c) Molecular formula $\times$ n = empirical formula (d) Molecular mass $\times$ empirical formula = n	(b) Molecular formula is integral multiple of empirical formula Where $n = \frac{\text{Molecular mass}}{\text{Empirical Formula mass}}$
89)	A molecule is the smallest particle	(b) Definition of molecule: A smallest



of a substance because

- (a) it has positive charge on it
- (b) it exist independently
- (c) it decomposes into ions
- (d) it is always mono atomic

particle of a substance which exists independently

90)	Which of the following salts will have greater positive charge in its molar aqueous solution? (a) $\text{Ca}(\text{Cl})_2$ (b) KCl (c) NH_4Cl (d) NaCl	(a) Ca^{++} ion is a dipositive ion while Na^+ , K^+ and N^+N_4 are unipositive ions. Therefore of positive charges in 1 mole of CaCl_2 solution is two times.
91)	Which one of the following statement is incorrect (a) actual yield is always less than the theoretical yield (b) the formula of compound is not definite (c) law of conservation of mass is applied in stoichiometry (d) law of definite proportions is applied in stoichiometry	(b) Formula of a compound is definite since formula is determined from constant composition of elements in the compound.
92)	Which one of the following steps is not involved in determination of empirical formula? (a) Determination % of each element (b) Determination of gram atoms of each element (c) Determination of isotopes of each element (d) Determination of atomic ratio of elements	(c) Empirical formula is determined from the % composition of the compound. The % of each element is divided by its average atomic mass and not its isotopic mass.
93)	2.38 grams of uranium contains U-atoms (a) 6.02×10^{22} (b) 6.02×10^{21} (c) 3.01×10^{22} (d) 3.01×10^{21}	(b) At mass of $\text{U} = 238$ 238 g U has no. of U-atoms = 6.02×10^{23} 2.38 g U has No. of U-atoms



	10^{21}		$= \frac{1}{100} \times 6.02 \times 10^{23} = 6.02 \times 10^{21}$
94)	What is the volume in cm^3 of 3.01×10^{23} molecules of O_2 gas at S. T. P. (a) 1000 cm^3 (b) 11000 cm^3 (c) 1120 cm^3 (d) 11200 cm^3	(c)	6.02×10^{23} molecules of O_2 at STP $= 22.414 \text{ dm}^3 = 22414 \text{ cm}^3$ $3.01 \times 10^{23} \text{ O}_2$ molecules has vol. $= \frac{22414}{2} = 11207 \text{ cm}^3$
95)	The total number of covalent bonds in 4.5 grams of water is (a) 6.02×10^{23} (b) 6.02×10^{22} (c) 3.01×10^{22} (d) 3.01×10^{23}	(d)	$18 \text{ g H}_2\text{O} = 1 \text{ mole H}_2\text{O} = 6.02 \times 10^{23} \text{ H}_2\text{O molecules}$ $4.5 \text{ g H}_2\text{O} = \frac{4.5}{18} \times 6.02 \times 10^{23} \text{ H}_2\text{O molecules}$ $= 1.505 \times 10^{23}$ $1 \text{ H}_2\text{O} = 2 \text{ covalent bonds}$ $1.505 \times 10^{23} \text{ H}_2\text{O has covalent bonds}$ $= 2 \times 1.505 \times 10^{23} = 3.01 \times 10^{23}$
96)	What is the mass of water formed when 4 grams H_2 and 64 grams of O_2 combined together (a) 66 grams (b) 18 grams (c) 36 grams (d) 66 grams	(c)	According to reaction $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ Or 4g H_2 reacts with 32g O_2 to form 36g H_2O .
97)	0.5 mole of CH_4 and 0.5 mole of SO_2 gases have equal (a) volume (b) mass (c) total number of atoms (d) Number of molecules	(d)	1 mole of any substance has 6.02×10^{23} molecules therefore 0.5 mole of different substances has no. of molecules equal.
98)	Combustion analysis is performed for determining (a) Number of ions (b) Empirical formula of organic compound (c) Structure formula (d) Isotopes of an element	(b)	Combustion analysis is performed only for determining empirical formula of organic compounds.



99)	Each molecule of haemoglobin is 68000 times heavier than one atom of (a) C (b) H (c) N (d) O	(b)	The size and mass of a molecule is compared with smallest sized atom i.e. H-atom
100)	x-ray work has shown that the diameters of atom are of the order of (a) 8×10^{-10} m (b) 2×10^{-10} m (c) 8×10^{-8} m (d) 2×10^{-12} m	(b)	Size of atom is of the order of 2×10^{-10}
101)	The value of R (General Gas Constant) is (a) $8.3134 \text{ JK}^{-1} \text{ mole}^{-1}$ (b) $1.987 \text{ Cal K}^{-1} \text{ mole}^{-1}$ (c) Both a and b (d) $1.987 \text{ JK}^{-1} \text{ mole}^{-1}$	(c)	In SI units the value of R $= 8.3143 \text{ JK}^{-1} \text{ mole}^{-1} \frac{8.3143}{4.18} \text{ Cal K}^{-1} \text{ mole}^{-1}$ $= 1.987 \text{ Cal K}^{-1} \text{ mole}^{-1}$ (1 Cal = 4.18 J)
102)	The amount of matter in substance is called its (a) Weight (b) mass (c) Volume (d) Density	(b)	Mass is defined as quality of matter in a substance
103)	The standard for atomic mass is (a) H (b) He (c) Ne (d) C	(d)	Atomic mass of an element is the mass of one atom of that element as compared to mass of 1 atom of C, taken as 12.
104)	The S.I. units for energy are (a) J (b) Calorie (c) K (d) Cd	(a)	In S.I. $1 \text{ J} = 1 \text{ Nm}$
105)	CH_4 is the chemical formula of (a) Ethane (b) Propane (c) Hydrogen (d) Methane	(d)	Formula of methane is CH_4 the simplest hydrocarbon.
106)	H_2O_2 is the chemical formula of (a) water (b) methane	(d)	Hydrogen dioxide or hydrogen peroxide has H_2O_2 formula.



	(c) Alcohol Peroxide	(d) Hydrogen	
107)	The empirical formula of chloroform is (a) CCl_4 (b) CHCl_3 (c) CH_2Cl_2 (d) CH_2O	(b)	Chloroform is the trichloro methane.
108)	The molecular formula and empirical formula may be (a) Identical (b) Different (c) Both a and b (d) None	(c)	Some compounds have same empirical and molecules formula like H_2O . But some have different like benzene C_6H_6 . Its empirical formula is CH.
109)	The Avogadro's number is (a) 6.0×10^{-23} (b) 6.022×10^{23} (c) 6.022×10^{-23} (d) 6.002×10^{-23}	(b)	Avogadro determined the number of molecules in 1 mole of the substance as 6.02×10^{23}
110)	Any substance having chemically identical atoms is called (a) Molecule (b) Element (c) Compound (d) None	(b)	An element has all atoms with same proton number.
111)	One 12th the mass of C_{12} is called (a) Atomic mass (b) A.m.u. (c) Both a and b (d) None	(b)	On carbon -12 scale, the relative atomic mass of C is 12. Therefore the unit to express the relative atomic mass (a.m.u) is $\frac{1}{12}$ th $\times 12$ $= 1 \text{ a.m.u}$
112)	Atomic weight of Ca is (a) 20 (b) 40 (c) 45 (d) 80	(b)	Ca has 20 protons and 20 neutrons in the nucleus.
113)	Tobacco contains a poisonous alkaloid called Nicotine. The molecular formula of nicotine is $\text{C}_{10}\text{H}_{14}\text{N}_2$ (molar mass = 162.23 g). the mass percentage of nitrogen in nicotine, is? a. 4.32% b. 8.23% c. 12.4% d. 17.3%		



- 114) A sample of an ionic compound d contains 2.82 g Na, 4.35 g Cl, and 7.83 g O. the empirical formula of this compound is:
- NaClO_2
 - NaClO_3
 - NaClO
 - NaClO_4

- 115) How many carbonate ions are there a in 50g of CaCO_3 ?
- $\frac{50}{100} \times 6.022 \times 10^{23}$
 - $\frac{100}{50} \times 6.022 \times 10^{23}$
 - $50 \times 10 \times 6.022 \times 10^{23}$
 - $\frac{50}{6.022 \times 10^{23}} \times 100$

- 116) Stoichiometric calculations can d only be carried out when
- The reaction is irreversible
 - There is no side reaction
 - At least one of the reactants is consumed completely
 - All of the above

- 117) How many molecules of oxygen c will be produced from the decomposition of 2 kilo moles of potassium chlorate according to the following reaction?
- $$2\text{KClO}_{3(s)} \rightarrow 2\text{KCl}_{(s)} + 3\text{O}_{2(g)}$$
- $3 \times 6.022 \times 10^{23}$
 - 3×10^3
 - $3 \times 10^3 \times 6.022 \times 10^{23}$
 - 6

- 118) All of the following are not b quantitative statements except
- This ore contains copper.
 - That E.D.T.A. solution is 0.1 molar
 - Let's start with an aqueous solution first.
 - It is sour it must be the citric acid.

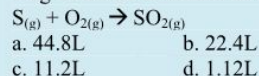
- 119) If theoretical and percentage yields d



of a product are 50g and 90g respectively, then actual yield of the product will be

- a. 80g b. 70g
c. 35g d. 45g

- 120) How many liters of sulfure dioxide at STP is produced from burning 1.6g of sulfur in excess of oxygen?



- 121) Which one among the following is NOT correct for a mole?

- a. It is a counting unit
b. It is the gram atomic or gram formula mass of substance
c. It contains particles
d. It contains different number of particles for different substances

- 122) How much calcium is present in 0.1g of CaCO_3 ?

- a. 0.01g
b. 0.02g
c. 0.03g
d. 0.04g

123)

Chap. 2 Atomic Structure

- 124) For production of characteristic K, X-rays, the electron transition if from:

- A)n 3 to 2 B)n 1 to n-2
C)n 2 to no 1 D) n 2 to n-3

- 125) The magnetic quantum number for the last sub orbital having 3 electrons in phosphorous $^{15}_{31}\text{P}$ is:

- 2018-Eng
A)-1, 0, +1 B)-1, 0, -1
C)0, -1, +2 D)-1, +1, -2

- 126) If the required excitation voltage is given, for which element the x-rays spectrum consists of three spectral



	lines i.e. K_{α} $k\beta$ L_{α} A)Na b) boron C)K D)Ca		
127)	Energy of electron in first excited state of Hydrogen atom in atom is. a) 2.8×10^{-18} b) 0.545×10^{-18} c) -2.18×10^{-18} d) -1312.36	B	Energy of 1st Excited state $-3.4\text{eV} = 3.4 \times 1.6 \times 10^{-19} \text{ J/atom} = -0.545 \times 10^{-18} \text{ J/atom}$.
128)	Which list shows electromagnetic waves in order of increasing frequency? A) Radio waves $\rightarrow$ gamma rays $\rightarrow$ ultraviolet $\rightarrow$ infra-red B) Radio waves $\rightarrow$ infrared $\rightarrow$ ultraviolet $\rightarrow$ gamma rays C) Ultraviolet $\rightarrow$ gamma rays $\rightarrow$ radio waves $\rightarrow$ infrared D) Ultraviolet $\rightarrow$ infra-red $\rightarrow$ radio waves $\rightarrow$ gamma rays	B	
129)	The charge on the electron and proton is reduced to half. If the present value of Rydberg constant is R., then the new value of Rydberg constant will be A) R/2 B) R/4 C) R/8 D) R/16	C	
130)	Two atoms A and Li have the electronic configuration given below: (x) $1S^2 2S^1 2P^6 3S^1$ (y) $1S^2 2S^2 2P^5$ Which of the following compounds are they likely to form? A) X_y B) X_y^2 C) X_1y D) X_y^3	A	
131)	The energy difference between adjacent energy levels of the hydrogen atom: A) Increases with increasing energy B) Decreases with increasing energy C) First increases & then decreases with increasing energy D) First decreases & then increases	B	



with increasing energy

132)	In the discharge tube emission the cathode rays requires: a) Low potential and low pressure b) low potential and high pressure c) high potential and high pressure d) high potential and low pressure	D	
133)	Particles involved in an ordinary chemical reaction are: (a) Protons (b) Neutrons (c) Electrons (d) All of the above	C	
134)	The constancy of e/m ratio for electron shows that ; (a) Electron mass is $1/1837^{\text{th}}$ of proton (b) Electrons are universal particles of all matter (c) Electrons are produced in discharge tube only (d) None of the above	B	
135)	The charge of electron was determined by the effect of electric field on rate of fall of oil droplets under gravity this was done by: (a) JJ Thomson (b) E Rutherford (c) R.A. Milliken (d) WC Roentgen	C	
136)	Which of the following rays has the longest wavelength? (a) Infrared rays (b) ultraviolet rays (c) Gamma rays (d) x-rays	A	
137)	Continuous absorption spectrum is obtained from (a) Excited atoms (b) Excited molecules (c) Ground state molecules (d) Ground state atoms	A	



138)	Who postulated the following equation for energy emission when an electron drops from state n_2 to n_1 ? (a) Einstein (b) Bohr (c) Rutherford (d) Heisenberg	B	
139)	For a H-atom which one of the following statements is correct? (a) the radius of the orbits are integral multiple of the Bohr-radius 0.053nm (b) the angular momentum is n times $\frac{h}{2\pi}$ (c) the energy in the nth- orbit is n times the ground state energy.(d) None of the above	B	
140)	The total energy of a Hydrogen atom in its ground state is: (a) zero (b) positive (c) negative (d) None	C	
141)	The energy of electron in the excited state $n=4$ in hydrogen atom is: (a) -13.6eV (b) -3.4eV (c) -0.85eV (d) -1.5eV	C	
142)	The part of electromagnetic spectrum in which Lyman series lies is: (a) Visible region (b) Infrared region (c) Ultra violet region (d) X-rays	C	
143)	Which one of the following series are observed in the visible region of electromagnetic radiation. (a) Lyman series (b) Balmer series (c) Bracket series (d) Plunds series	B	
144)	Transition from $n = 4, 5, 6, \dots$ to $n = 3$ in hydrogen spectrum gives (a) Balmr series (b) Lyman series	C	



	(c) Paschen series (d) Pfund series		
145)	The wave nature of an electron is illustrated by its: (a) photoelectric effect (b) Compton effect (c) penetrating effect (d) diffraction	D	
146)	A ball of mass 1 gram is moving with a velocity of 10^3 m s^{-1} . The De-broglie wavelength of the ball is: (a) $13.26 \times 10^{-36} \text{ m}$ (b) $3.315 \times 10^{-34} \text{ m}$ (c) $6.63 \times 10^{-34} \text{ m}$ (d) $4.97 \times 10^{-36} \text{ m}$	C	
147)	How many different values can m, assume in the electron sub-shell designated by quantum number $n=5, l=4$? (a) 4 (b) 5 (c) 6 (d) 9	D	
148)	The number of orbital's in 'M' shell of an atom is; (a) 1 (b) 4 (c) 5 (d) 9	D	# of orbital in shell = $n^2 = (3)^2 = 9$
149)	If an atom exists in the excited state $n = 5$, the maximum number of transition takes place is: (a) 6 (b) 5 (c) 10 (d) 3	C	# of transition (spectral lines) = $\frac{n(n-1)}{2}$ $= \frac{5(5-1)}{2} = \frac{20}{2} = 10$
150)	An orbital may never be occupied by: (a) 1 electron (b) 2 electrons (c) 3 electrons (d) 0 electron	C	
151)	Nitrogen has three unpaired electrons according to: (a) Hund's rule (b) Aulban rule (c) Paoli's exclusion principle(d) Thumb rule	A	
152)	The atomic number of scandium is	C	



21. What is its ground state electronic configuration?

- (a) $1s^2 2N^2 2p^6 3N^2 3p^6 3d^3$
(b) $1s^2 2N^2 2p^6 3N^2 3p^6 3d^3 4s^1$
(c) $1s^2 2N^2 2p^6 3N^2 3p^6 3d^1 4s^2$
(d) $1s^2 2N^2 2p^6 3N^2 3p^6 3d^3 4p^1$

153) The correct electronic configuration of Nickel (28) is: A

- (a) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
(b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2 4p^1$
(c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2 4p^2$

(d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1 4p^3$

154) The electronic configuration of gallium, atomic number 31 is: A

(a) $[Ar] 4s^2 3d^{10} 4p^1$ (b)

$[Ar] 3s^2 3d^{10} 4p^1$

(c) $[Kr] 3s^2 3d^{10} 4p^1$ (d)

$[Kr] 4s^2 3d^{10} 4p^1$

155) Which is incorrect about ionization energy? D

- (a) Ionization energy Depends upon the magnitude of nuclear charge.
(b) Ionization energy depends upon the atomic radius
(c) Ionization energy depends upon the shielding effect.
(d) Ionization energy does not depend upon the penetration effect of the inner orbital. .

156) Select the incorrect Statement: C

- (a) Molecule may gain electron to form molecular anion.
(b) Molecule may lose electron to form molecular cation.
(c) Molecular cations are less abundant than molecular anions.
(d) These molecular ions can be formed by passing high energy electron beam through a gas.

157) Rutherford's scattering experiment demonstrate: D

- a) The existence of X-rays.



- b) The existence of α -particles.
c) The mass to charge ratio of electron.
d) The nuclear model of the atom.

158)	Which is incorrect statement? (a) The ionic bonds are non directional in character. (b) The crystals of covalent compounds are made up of molecules. (c) The covalent bonds are rigid and non directional. (d) Ionic compounds have high melting point and boiling point.	C																					
159)	When hydrogen gas is enclosed in a discharge tube using low pressure, it emits: (a) Green light (b) Blue light (c) Red light (d) Yellow light	B																					
160)	Which of the following elements with the given electronic configuration has the highest ionization energy? (a) $1S^2 2S^2 2P^4$ (b) $1S^2 2S^2 2P^3$ (c) $1S^2 2S^2 2P^6 3S^1$ (d) $1S^2 2S^2 2P^6 3S^2 3P^3$	B																					
161)	Shown below are portion of orbital diagrams representing the ground state electronic configuration of certain elements. Which of them obeys the Pauli's exclusion principle? Hund's rules? (a) <table border="1"><tr><td>↑</td><td>↑</td><td>↑</td></tr></table> (b) <table border="1"><tr><td>↑</td><td>↑</td><td>↑</td></tr><tr><td></td><td>↓</td><td></td></tr></table> (c) <table border="1"><tr><td>↑</td><td>↑</td><td>↑</td></tr><tr><td></td><td></td><td>↓</td></tr></table> (d) <table border="1"><tr><td>↑</td><td>↑</td><td>↓</td></tr><tr><td>↑</td><td>↑</td><td></td></tr></table>	↑	↑	↑	↑	↑	↑		↓		↑	↑	↑			↓	↑	↑	↓	↑	↑		C
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↑	↑																						
162)	Which of the following electromagnetic waves has the smallest wavelength?	C																					



	(a) X-rays (b) Gamma rays (c) Microwaves (d) Ultraviolet rays		
163)	Choose atom that is not having a spin quantum number $\frac{1}{2}$. (a) C^{13} (b) N^{15} (c) F^{19} (d) O^{16}	D	
164)	X-rays are widely used as a diagnostic tool in Medicine because of its (a) Particle property (b) Cost of X-ray unit is low (c) High penetrating power (d) It is not electromagnetic waves	C	
165)	What are the values of principal quantum number and azimuthal quantum number for the last electron in Chlorine atom? (a) 1.6 (b) 1.3 (c) 3.1 (d) 6.1	C	
166)	Choose atom that is not having a spin quantum number $\frac{1}{2}$. (a) C^{13} (b) N^{15} (c) F^{19} (d) O^{16}	D	
167)	The e/m of canal rays: a. Varies with the nature of gas in discharge tube b. Is independent of gas in discharge tube c. Is constant d. None of these	A	$\frac{e}{m}$ of canal rays depends upon the nature of gas.
168)	Which one has maximum e/m ratio? a. Cathode ray b. Canal rays c. Beta rays d. Both a and c	A	Cathode rays are electrons and electron have smaller mass than proton or any positive ion (canal ray) thus it has maximum e/m
169)	Which one of the following has maximum e/m ratio? a. Cathode rays b. Canal rays c. X-rays	A	Cathode rays are actually electrons which have very smaller mass so they have maximum e/m ratio. While Gamma-rays and X-rays are electromagnetic radiations having e/m



	d. Gama rays		ratio is zero.
170)	Which of the following is not electromagnetic in nature? a. Infrared ray b. X-rays c. Y-rays d. Cathode rays	D	Cathode ray are electron having mass and charge so it is not electromagnetic radiations.
171)	Wave mechanical model of the atom mdepends upon? a. De-Broglie's concept of duality b. Heisenberg uncertainly principle c. Schrodinger wave equation d. All of these	D	Wave model f the atoms depends on De-Broglie's concept of duality, Heisenberg uncertainly principle and Schrodinger wave equation
172)	Which electronic level in hydrogen atom will allows absorption of energy and not emission? a. 3s b. 2p c. 2s d. 1s	D	1s is the lowest electronic level, it can only absorb the energy, it cannot emit the energy because there is no other electronic level below it.
173)	The Balmer series in the spectrum of hydrogen atom fall in: a. Ultraviolet region b. Visible region c. Infrared region d. None of these	B	It is the visible region
174)	A line in Pfund series is obtained when an electron form higher energy level returns to: a. 1 st orbit b. 3 rd orbit c. 5 th orbit d. 6 th orbit	C	For pfund series $n_1 = 5$ and $n_2 = 6, 7, 8, \dots$
175)	When the electron jump from 2 nd 3 rd , 4 th orbit to the 1 st then transition is known as a. Balmer series b. Lyman series c. Pfund series d. Bracket seires	B	for Lyman series $n_1 = 1$ and $n_n = 2, 3, 4, 5, \dots$
176)	If $n = 6$ the number of standing	A	As $n\lambda = 2\pi r \Rightarrow n = 6 \Rightarrow 6\lambda = 2\pi r$



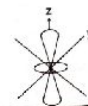
	waves? a. 6 b. 8 c. 36 d. 16		So, the number of standing waves for $n = 6$ is 6.
177)	The total values of magnetic quantum number for a given value of principal quantum number (n)? a. $2l + 1$ b. N^2 c. $N - 1$ d. $N + 1$	B	It is given as n^2 For 1 st shell = $(1)^2 = 1 \Rightarrow s$ For 2 nd shell = $(2)^2 = 4 \Rightarrow s, px, py, pz$ For 3 rd shell = $(3)^2 = 9 \Rightarrow s, px, py, pz, dxy, dyz, dzx, dx^2y^2, dz^2$
178)	The sub-shell which does not exist, has the quantum numbers: a. $N = 2, l = 0$ b. $N = 2, l = 1$ c. $N = 2, l = 2$ d. $N = 3, l = 0$	C	Because n and l can't have same values.
179)	Out of the following, which is the correct set of quantum numbers for the outermost electron of potassium atom ($Z = 19$)? N l m s a. 4 3 2 -1/2 b. 4 2 0 -1/2 c. 4 1 0 +1/2 d. 4 0 0 -1/2	D	For K the electronic configuration is $4s^1$ $N = 1, l = 0, m = 0, s = \frac{-1}{2}$
180)	The two electrons in the first shell will differ in the values of: a. N b. L c. M d. S	D	No two electrons in the same orbital have the same spin according to Pauli exclusion's principle.
181)	Which one of the following set of quantum numbers is not allowed? a. $N = 1, l = 0, m = 0, s = -1/2$ b. $N = 2, l = 1, m = 0, s = +1/2$ c. $N = 2, l = 1, m = +1, s = +1/2$ d. $N = 2, l = 1, m = +2, s = 0$	D	$N = 2, l = 1, m = +2, s = 0$ 2p for p orbital m should be +1, 0, -1
182)	The orbital with $n = 4$ and $l = 2$ is: a. 3s b. 3p c. 3d	C	$N = 3, l = 2 \Rightarrow 3d$



	d. 3f		
183)	In which orbital electron has a maximum energy? a. $N = 4, l = 0, m = 0, s = +\frac{1}{2}$ b. $N = 3, l = 1, m = -1, s = -\frac{1}{2}$ c. $N = 5, l = 3, m = -2, s = -\frac{1}{2}$ d. $N = 2, l = 1, m = +1, s = -\frac{1}{2}$	a	All have same $n + l$ values which is 5 but the n value of 3d is lower so it has the lowest energy.
184)	Which one of the following orbitals has the lowest energy? a. 3d b. 5s c. 4p d. 4f	A	According to $n + l$ rule $4s \Rightarrow n + l = 4 + 0 = 4$ (lowest energy level) $3d \Rightarrow n + l = 3 + 2 = 5$ $4p \Rightarrow n + l = 4 + 1 = 5$ $4d \Rightarrow n + l = 4 + 2 = 6$
185)	Which quantum number accounts for the appearance of fine lines in hydrogen spectra? a. Subsidiary quantum number b. Secondary quantum number c. Azimuthal quantum number d. All are correct	D	Magnetic quantum number has been obtained by the solution of schrodinger's wave equation.
186)	The azimuthal quantum number $l = 2$ then 'm' can have values as: a. +1, -1 b. +1, 0, -1 c. +2, +1, 0, -1, -2 d. +3, +2, +1, 0, -1, -2, -3	C	$l - 2$ $m = +1, 0, -1$ $= +2, +1, 0, -1, -2$
187)	how many nodes are present in 3s orbital? a. 0 b. 1 c. 2 d. 3	C	$\Rightarrow$ Angular node = 1 For s orbital $l = 0$ So angular node = 0 $\Rightarrow$ radial node = $n - l - 1 = 3 - 0 - 1 = 2$ Total node = Radial node + angular node $= 2 + 0 = 2$
188)	How many radial nodes are present in 7s orbital? a. 6 b. 9 c. 8 d. 7	A	Use the formula to find the radial nodes = $n - l - 1 = 7 - 0 - 1 = 6$
189)	The orbital dz^2 consists of: a. 4 lobes b. 2 lobes	B	Dz^2 orbital has two lobes and one ring



- c. 1 lobes
d. Zero lobe



190)	What is the correct outer electronic configuration of Cu (Z = 29) ? a. $4s^1 3d^{10}$ b. $4s^2 3d^9$ c. $4p^2 3d^9$ d. $3s^2 3d^9$	A	The expected electronic configuration is to be $4s^2 3d^9$ but the one s electron is shifted to 3d subshell to fill it completely because fully filled orbital is more stable than partially filled so the electronic configuration will be $4s^1 3d^{10}$.
191)	Orbitals having same energies are called: a. Degenerate orbitals b. Hybrid orbitals c. Valence orbitals d. D – orbitals	A	Orbitals having same energies are called degenerate orbitals.
192)	Which one of the following has the same number of electrons as an alpha particle? a. H b. H^+ c. H_2 d. He	B	Alpha particle is Helium nucleus (He^{+2}) has no electron. H^+ is proton which has also no electron. So, both have zero electrons.
193)	What is the proton (atomic) number of an element that has four unpaired electrons in its ground state? a. 6 b. 14 c. 16 d. 26	D	$Fe = 4s^2 3d^6$ (Valence shell electronic configuration) $ \begin{array}{ccccccc} 1\downarrow & 1\downarrow & 1 & 1 & 1 & 1 \\ 4s^2 & & 3d^6 & & & \\ & & & & 4\text{-unpaired electrons} & \end{array} $
194)	Which of the following particles would, on losing an electron, have a half-filled set of P orbitals? a. C b. N c. N^{-1} d. O^{-1}	C	Electronic configuration of nitrogen $1s^2 2s^2 2p^3$ $ \begin{array}{cccc} 1\downarrow & 1 & 1 & 1 \text{ (Valence shell)} \\ \text{In case of } N^{-1} \\ 1\downarrow & 1\downarrow & 1 & 1 \\ \text{By losing one electron by } N^{-1} \text{ the half-filled p-orbital will be obtained.} \end{array} $
195)	For which element does its ground state atom have no paired p electrons? a. Carbon b. Oxygen	C	In the ground state of carbon all the electrons in p orbital are unpaired. Electronic configuration of carbon (ground state) $1s^2, 2s^2, 2p^2$



	c. Neon	1↓	1↓	1 1
	d. Magnesium	1s	2s	2p
196)	The electronic configuration of ^{24}Cr is: a. $3d^6$ b. $3d^4 4s^2$ c. $3d^5 4s^1$ d. None of these	C	Expected electronic configuration of Cr is $= 4s^2 3d^4$ (Valence shell) But to get a stability one of 4s electron is shifted to 3d orbital because half-filled orbital is more stable than partially filled orbital thus its electronic configuration will be $4s^1 3d^5$.	
197)	Most of the alpha particles were deflected at larger angles in Rutherford experiments because of a. Positive nucleus in center b. Empty spaces in atom c. A-particle overlapping d. None	A	A-particle has dipositive charge and nucleus has also positive charge thus nucleus repels the a-particle through various angles.	
198)	What did Millikan determine in his experiment? a. Charge on electron b. Charge on electron is quantized c. Weight of charged droplets d. Both a and b	A	Millikan determined the charge on electron. He concluded that charge on each droplet is an integral multiple of the smallest charge, it means that charge is quantized.	
199)	In Millikan's experiment several droplets created by atomizer which droplet has the highest downward velocity a. 0.021 mg b. 0.003 mg c. 0.11 mg d. 0.032 mg	C	The downward velocity due to gravity is given as $v = mg$ so the droplet having larger mass should have highest downward velocity.	
200)	Millikan's drop experiment can be performed with drops of a. Small size b. Large size c. Any size d. None	A	Millikan's drop experiment can be performed on small oil droplets. Larger drops have greater force of gravity, we have to apply high electric field to balance the weight of larger drop which may not be possible, so it may not be possible to perform Millikan's experiment in drop of any size.	
201)	The instrument which measures the absorbance or emission of intensity	(a)	The radiations emitted are seen through a spectrometer. It measures	



and frequency is called

- (a) Spectrophotometer
- (b) Polarimeter
- (c) Glucometer
- (d) Calorimeter

the wavelength, frequency etc. of radiations.

202)	Photons of yellow colour are energetic than violet colour (a) More (b) Less (C) Equal (d) None	(b)	The wavelength of yellow radiations region is 580 - 600 nm and that of violet is 400 430 nm. Shorter the wavelength of radiation higher is the frequency and greater is the energy.
203)	Which is the units of length (a) Angstrom (b) Poise (c) H (d) None	(a)	1 Å = 10 ⁻¹⁰ m.
204)	Balmer's series is in ----- region (a) Visible (b) U.V. (C) I.R. (d) None	(a)	The wave numbers of the lines emitted for H-atom are 15.21 x 100 m (H _α) to 25.18 x 10 ⁵ m. lie in the visible region, which are called Balmer lines.
205)	Spectrum of He is expected to be similar with (a) H (b) Na (c) Be (d) Lit	(d)	The atomic number of He is 2 i.e. it contains two electrons. Lit also contains having two electrons (Atomic Number of Li is 3). And spectrum of an atom or ion depends upon number of electrons.
206)	Magnetic quantum number represents <i>orbital</i> (a) Size (b) Shape (c) Orientations (d) Nuclear stability	(c)	Magnetic quantum number tells us the number of different ways in which a given S, P, d or f-subshell can be arranged along the x, y and z-axes. These different ways are different orientations.
207)	Pauli's principle is applicable to (a) Degenerate orbitals (b) Two electrons in the same orbital (c) One electron	(b)	Two electrons in an orbital have opposite spins according to Pauli's Principle.



(d) None

208)	If $l = 2$ then the orbital will be ----- ----- orbital (a) s (b) p. (c) d (d) f	(c) A subshell may have different shapes depending upon the value of 'l'. When $l = 2$, it is a d-subshell with complicated shapes.
209)	in the ground state of an atom the electron is present (a) In the nucleus (b) In the second shell (c) Nearest to the nucleus (d) Farthest from the nucleus	(c) Ground state is the lowest energy state. Electron closest to the nucleus is in lowest energy state.
210)	When the 6d orbital is completed the entering electron goes into (a) 7f (b) 7s (c) 7p (d) 7d	(c) According to Auf bau principle 7p is the next subshell after filling of 6d since both have same $n + l$ value i.e. 8.
211)	The radius of first orbit of hydrogen atom (a) 0.329Ao (b) 0.429Ao (c) 0.529A (d) 0.229Ao	(c) According to Boh. theory radius of an orbit For H-atom $Z=1$ and $a_0 = 0.529^{\circ}\text{A}$ And radius of first orbit of H-atom $= 0.529^{\circ}\text{A}(n^2) = 0.529^{\circ}\text{A}(1)^2 = 0.529^{\circ}\text{A}$
212)	The divisibility of atom was shown by (a) Stoney (b) J.J. Thomson (c) Millikan (d) Rutherford	(b) J.J. Thomson concluded from his experiments that all atoms contained negatively charged particles called electrons.
213)	When the pressure of the gas in discharge tube is reduced, which of the following becomes more prominent (a) Gas glows (b) Gas ionizes (c) A discharge takes place (d) Gas conducts electricity	(c) When the pressure inside the tube is reduced, and a high voltage 5000 - 10000 volts is applied, an electric discharge take place producing a uniform glow..
214)	Goldstein discovered that besides the cathode rays, another type of	(c) When high speed cathode rays (electrons) strike the gas molecules in



	rays are produced in the discharge tube which are called (a) Alpha rays (b) Beta rays (c) Positive rays (d) Gamma rays	the discharge tube, they knock out electrons from the gas molecules and positive ions are produced
215)	The value of Plank's constant 'h' is (a) 6.625×10^{-34} (b) 6.625×10^{-34} J sec (c) 6.625×10^{-34} KJ (d) 6.625×10^{-34} K Cal	(b) It is a constant value
216)	The regions of the visible spectrum are (a) Three (b) Seven (c) Eight (d) Five	(b) Violet, indigo, blue, green, yellow, orange and red radiations are the visible radiations.
217)	After performing millikan oil drop experiment in laboratory, a professor told his students that charge on 500mg of electrons must be a. -3.52×10^7 C b. -3.52×10^{17} C c. -8.8×10^{17} C d. -8.8×10^7 C	D
218)	Total charge on 10 electrons is a. -1.6×10^{-20} C b. -1.6×10^{-17} C c. -3.2×10^{-19} C d. -1.6×10^{-18} C	D
219)	If E_1 , E_2 , E_3 and E_4 are the energies of electron in first, second, third and fourth shells of hydrogen atom then a. $E_2 - E_1 < E_3 - E_2 < E_4 - E_3$ b. $E_2 - E_1 > E_3 - E_2 > E_4 - E_3$ c. $E_2 - E_1 < E_3 - E_2 > E_4 - E_3$ d. $E_2 - E_1 > E_3 - E_2 < E_4 - E_3$	B
220)	The series corresponding to $n_1 = 2$, $n_2 = 4$ lies in visible range and is called. a. Lyman series	B



- b. Balmer series
- c. Paschen series
- d. Bracket series

221) The series of spectral lines obtained due to the following transition belongs to Pfund series

- a. $n_1 = 4, n_2 = 7$
- b. $n_1 = 3, n_2 = 6$
- c. $n_1 = 5, n_2 = 7$
- d. $n_1 = 3, n_2 = 5$

222) Bohr's model of hydrogen atom is not applicable to all of the following except

- a. Li^{1+}
- b. He^{1+}
- c. Be^{2+}
- d. H^+

223) All of the following are isoelectronic with hydrogen except

- a. He^{1+}
- b. Li^{1+}
- c. Be^{3+}
- d. B^{3+}

224) Wavelength of electron

- a. Decreases with decrease in its velocity
- b. Does not depend on its velocity
- c. Is electromagnetic
- d. Decreases with increase in its velocity

225) Total number of sub energy levels in the fifth energy level is

- a. three
- b. four
- c. five
- d. six

226) Total number of orbitals in the fifth energy level is

- b. 25
- c. 16
- d. 9



- 227) Velocity of an electron will be A
maximum in the
a. first energy level
b. second energy level
c. third energy level
d. fourth energy level
- 228) The statement that “no two C
electrons in an atom can have the
same set of four quantum numbers
is
a. Aufbau principle
b. Hund’s rule
c. Pauli exclusion principle
d. Heisenberg’s uncertainty
principle
- 229) Color of the glow produced in the C
discharge tube
a. depends on the pressure in the
discharge tube
b. depends on the metal used as
cathode
c. depends on the gas used in the
discharge tube
d. does not depend on the nature of
the gas
used in the discharge tube
- 230) The quantum number that specifies C
the way the
orbital is oriented in space is the
a. principal quantum number
b. azimuthal quantum number
c. magnetic quantum number
d. spin quantum number
- 231) The size of an atomic orbital is A
associated with the
a. principal quantum number
b. azimuthal quantum number
c. magnetic quantum number
d. spin quantum number
- 232) Wave number is the number of A
waves in a distance of



	a. 1m c. 3m	b. 2m d. 4m		
233)	In a line absorption spectrum a. Bright lines are due to absorbance b. Dark lines are due to transmittance c. Bright and dark lines are due to absorbance and transmittance respectively d. Bright and dark lines are due to transmittance and absorbance respectively		D	
234)	According to Bohr's model separation between first and second orbits of hydrogen atom is a. 0.529Å b. 2.11Å c. 2.64'' ... d. 1.58Å		D	
235)	Which one of the following statements is true for an orbital? a. It is the shape of electron cloud b. It is the graphical representation of the region in which probability of electron is maximum c. It is a small part of the orbit d. It represents the size of electron cloud		B	
236)	CHAPTER 3: THEORIES OF COVALENT BONDING AND SHAPES OF MOLECULES			
237)	The bond energy of H ₂ molecule (H ₂ → 2H) is: A) 436 KJ/mol B) 40.7 KJ/mol C) 272 kJ/mol D) 436		D	



Avogadro's no KJ/mol

238)	Condisidering the molecular orbital theory (MOT) choose the correct relative energies order: a) $\sigma_{15} < \sigma^*_{15} < \sigma_{25} < \sigma^*_{25} < \sigma_{2Px} < \pi_{2Pz} = \pi_{2Py} < \sigma^*_{25} < \sigma^*_{2Px} < \pi^*_{2Pz} < \pi^*_{2Py}$ b) $\sigma_{15} < \sigma^*_{15} < \sigma_{25} < \sigma^*_{25} < \pi_{2Py} = \pi_{2Pz} < \pi_{2Px} < \sigma^*_{25} < \sigma^*_{2Px} < \pi^*_{2Pz} < \pi^*_{2Py}$ c) $\sigma_{15} < \sigma^*_{15} < \sigma_{25} < \sigma^*_{25} < \pi_{2Px} = \pi_{2Py} < \pi_{2Pz} < \sigma^*_{25} < \sigma^*_{2Px} < \pi^*_{2Pz} < \pi^*_{2Py}$ d) $\sigma_{15} < \sigma^*_{15} < \sigma_{25} < \sigma^*_{25} < \pi_{2Py} < \pi_{2Pz} < \pi_{2Px} < \sigma^*_{25} < \sigma^*_{2Px} < \pi^*_{2Pz} < \pi^*_{2Py}$	A
239)	The existence of H is not possible because: A. It would be disproportion B. It would ratio active C. It violate the pauli exclusion principle D. No H-H bond would form	D
240)	Silver mirror is given by: A. Aldehyde B. Ketone C. Ethers D. Acids	A
241)	Select the one having half-filled P Orbitals on losing an electron: A Nitrogen B.Lithium C.Oxygen D.Fluorine	C
242)	Which of the following ions contain one unpaired electron? A) Zn^{+2} B) K^{+1} C) Cu^{+2} D) Na^{+1}	C
243)	According to VSEPR theory, in which of the following molecules the electron pair geometty is: A) CH_4 B) NH_3 C) BF_3 D) None of the above	B
244)	The orbital with highest energy is A)Hybrid B)Un-hybrid C)Molecular) all are of equal energy	C
245)	The unpaired electron in the molecule of NH_3 is:	A



- A) 0 b) 1
c) 2 d) 3

246)	Unhybrid "P" orbitals on linear overlap: A) Always form $\text{Pi}(\pi)$ bond B) Always form $\text{Sigma}(\sigma)$ bond C) Neither form "a" nor "" bond D) Form more reactive and more unstable " π " bond	C	
247)	Specie with dipole moment equal to zero is: A) CO_2 B) CH_4 C) 1-4-Dibromobenzene D) all of the above	d	
248)	In the compound CO_2 , and H_2O the hybridization in oxygen is respectively; A) Sp^2 and Sp^3 B) Sp^2 and Sp^3 C) Sp^3 and Sp^3 D) Sp^3 and Sp^2	B	
249)	Select molecule that has unpaired electrons in anti-bonding molecular orbitals: A) N_2 B) Cl_2 C) H_2 D) O_2	D	
250)	Choose the type of hybridization of carbon atoms in cyclopropane and the bond angle C–C–C. A) Sp^3 , 109.5° B) Sp^3 , 60° C) Sp^2 , 120° D) Sp^2 , 107°	B	
251)	The shape of SnCl_2 is: A) Linear B) Trigonal pyramidal C) Trigonal planar D) Angular	D	
252)	What happens to the molecule when its atoms are brought closer than the bond length between them? (a) Molecule becomes unstable (b) Molecule becomes more stable (c) Molecule starts vibrating	A	



	(d) Stability of the molecule remains un-changed		
253)	What causes a sharp increase in the energy with a further decrease in the distance between atoms A and B after bond formation? (a) Attraction of atoms A and B (b) Repulsion of nuclei of A and B and electrons of A and B (c) Attraction of nucleus of A and electron of B (d) Bond formation	B	
254)	During the formation of a chemical bond between two atoms the forces which are operative are: (a) Both forces of attraction and repulsion (b) Either force of attraction nor repulsion (c) Only force of attraction (d) Only force of repulsion	A	
255)	Which of the following elements with a given electronic configuration has the highest ionization potential value? (a) $1s^2 2s^2 2p^3$ (b) $1s^2 2s^2 2p^4$ (c) $1s^2 2s^2 2p^6 3s^1$ (d) $1s^2 2s^2 2p^6 3s^2 3p^3$	A	
256)	Which one will show ionic bonding? (a) NaH (b) $PbCl_4$ (c) HCl (gas) (d) PCl_3	A	
257)	The longest bond is of: (a) H – I (b) H – O (c) H – S (d) H – Cl	A	Electronegative difference $\propto \frac{1}{\text{bond length}}$
258)	Which one of the following compounds has the shortest carbon-halogen bond? (a) CH_3F (b) CH_3Cl (c) CH_3Br (d) CH_3I	A	
259)	CO_2 is ISO-structural with:	A	



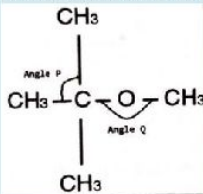
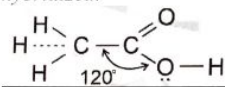
- (a) HgCl_2 (b) SnCl_2
(c) C_2H_2 (d) NO_2

260)	Oxygen molecule has two unpaired electrons. It is therefore, (a) Ferromagnetic (b) Diamagnetic (c) Electromagnetic (d) Paramagnetic	D	
261)	Which of the following hybridization can explain the shape of BeCl_2 ? (a) sp^2 hybridization (b) sp hybridization (c) sp^3 hybridization (d) dsp^2 hybridization	B	
262)	Which of the following pairs of molecules have similar geometry? (a) CO_2 and SO_2 (b) BF_3 and NH_3 (c) MgCl_2 and AlCl_3 (d) CH_4 and SiH_4	D	
263)	How many sigma bonds are there in $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$? (a) 6 (b) 9 (c) 11 (d) 4	B	
264)	The bond angle between $\text{H} - \text{C} - \text{C}$ bond in ethane is: (a) 109.5° (b) 120° (c) 90° (d) 107.5°	A	
265)	What type of hybrid orbits are used by the carbon atoms in C_2H_4 ? (a) sp (b) sp^2 (c) d^2sp^2 (d) sp^3	B	
266)	Species in which the central atom uses sp hybrid orbital in its bonding is: (a) PH_3 (b) NH_3 (c) SbH_3 (d) C_2H_2		
267)	The bond form between boron and Hydrogen is: (a) Ionic (b) Covalent (c) Coordinate covalent (d) None of the above		



268)	The behavior of PbCl_2 and PbCl_4 respectively are: (a) Ionic and covalent (b) Covalent and ionic (c) Covalent and coordinate covalent (d) Ionic and coordinate covalent	A	
269)	What type(s) of bonds is/are present in NH_4Cl ? (a) Ionic (b) Covalent (c) Co-ordinate covalent (d) All of them	D	
270)	In which compound the bond angle is maximum? a) Methane b) Beryllium chloride c) Ammonia d) Boron trifluoride	B	
271)	London forces are stronger in: A) Br_2 B) I_2 C) F_2 D) Cl_2	B	
272)	What is true about modern methods used in the determination of the structure of compounds? A) Accurate but more time consuming B) Accurate, rapid but chemicals are used in large amounts C) Accurate, rapid but sophisticated and complicated D) Accurate, simple and less time consuming	D	
273)	Bond energy of covalent bond decreases with the increase in: a) Polarity (b) Multiplicity (c) Size of atom (d) All of the above	C	
274)	In the compound $^4\text{CH}_2 = ^3\text{CH} - ^2\text{CH} = ^1\text{CH}_2$ (a) C-1 and C-2 are SP^2 hybridized (b) C-1 and C-2 are SP hybridized and C-2 and C-3 are SP^2 hybridized	C	



	(c) All the carbon atoms are sp^2 hybridized (d) All the statements are wrong		
275)	$NH_4^{(+)}$ and SO_4^{-2} ions have a. Tetrahedral geometry b. Triangular geometry c. Pyramidal geometry d. Square planner geometry	A	Geometry of a molecule depends on the lone pair and bond pair both of them are sp^3 hybridized thus both have tetrahedral geometry.
276)	MTBE is a constituent of petrol. What are the value of angle P and Q in a molecule of MTBE? 	C	VESPER theory is helpful in predicting the bond angles in compound like MTBE the bond angles p and q are 109° and 105° respectively.
277)	Which of the following molecules is not planner? a. Benzene b. Ethane c. Boron trifluoride d. Phosphorous trichloride	D	PF_3 has tetrahedral geometry and its shape is trigonal pyramidal which is not planner.
278)	The molecular structure of $BeCl_2$ is: a. Linear b. Tetrahedral c. Trigonal d. None of these	A	Structure of $BeCl_2$ is linear because Be is sp hybridized and have no lone pair $Cl - Be - Cl$ Linear Structure
279)	What is the approximate value of the O-C-O bond angle in thanoic acid? a. 45° b. 90° c. 109° d. 120°	D	The bond angle in ethanoic acid is 120° because the carbon is sp^2 hybridized. 



280)	N which one of the following pairs of molecules have similar shapes? AlCl_3 and BCl_3 AlCl_3 and PCl_3 BF_3 and NH_3 BeCl_2 and H_2O	A	AlCl_3 and BCl_3 both have trigonal planar shapes because they have same hybridization that is sp^2 and no lone pair.
281)	Lateral overlapping expected in: - Sigma bonds π Bonds - Ionic bonds - Metallic bonds	B	Lateral overlapping (sidewise) is weak overlapping which results in a weaker bond called π-bond during bond formation.
282)	In the molecule $\text{CH}_2 = \text{C} = \text{CH}_2$, the hybrid state of carbon number 2 is: sp^3 sp^2 sp dsp^3	C	The carbon number 2 in $\text{CH}_2 = \text{C} = \text{CH}_2$ has steric number 2. As steric number = no of attached atom to carbon + lone pair $2 + 0 = 2$ so it is sp hybridized
283)	In SO_2 molecule, S atom is: sp^3 hybridized sp^2 hybridized sp hybridized dsp^2 hybridized	B	SO_2 Steric number = number of atoms attached to sulphur atom + lone pair $= 2 + 1 = 3$ So it is sp^2 hybridized
284)	In PCl_5 molecule the phosphorus atom is: sp^3 hybridized sp^3d hybridized sp^3d^2 hybridized sp^2 hybridized	B	For PCl_5 Steric number = attached atom to phosphorous + lone pair $= 5 + 0 = 5$ So hybridization of phosphorous is sp^3d
285)	Which hybridization occurs in SO_3? sp^2 sp dsp^2 sp^3	A	Steric number helps us to determine the type of hybridization. Steric number = No. of atoms bonded to central atom + No. of lone pairs of electrons $\text{Steric number} = 3 + 0 = 3$ So Sulphur is SO_3 is sp^2 hybridized
286)	Which of the following compounds gives sp^3 hybridization? H_2O NH_3	D	All these molecules have steric number 4 so they have sp^3 hybridization of central atom.



	c. CH ₄ d. All the above		
287)	In which one of the following sp ³ hybridization occurs? a. CH ₄ b. KMnO ₄ c. H ₂ SO ₄ d. All of them	D	For CH ₄ Steric number = 4 so sp ³ hybridization For KMnO ₄ as Mn is attached to four oxygen so steric number = 4 So, it is sp ³ hybridized In H ₂ SO ₄ , sulphur is attached to four oxygen, so steric number = 4 It is sp ³ hybridized.
288)	Among the following the paramagnetic is: a. NO b. NO ⁺ c. NO ⁻ d. Both a & c	D	Unpaired electrons give the paramagnetic property to a molecule. Both NO and NO ⁻ have unpaired electrons so they are paramagnetic.
289)	Oxygen molecule is paramagnetic because it has: a. Less N _b than N _a b. More N _b than N _a c. All electrons are paired d. Unpaired electrons	D	Because presence of unpaired electrons is responsible for the paramagnetic nature of a molecule. O ₂ showing paramagnetic nature because it has 2 unpaired electrons.
290)	Molecular orbitals are a. Delocalized b. Localized c. Normalized d. All of these	A	Molecular orbitals which are not confined between two adjacent bonding atoms but actually extend over three or more atoms, are called delocalized molecular orbitals.
291)	Which among the species O ₂ ⁺ , O ₂ ⁻ , O ₂ and O ₂ ²⁻ is diamagnetic? a. O ₂ ⁺ b. O ₂ ⁻ c. O ₂ d. O ₂ ²⁻	D	All of the given species have unpaired electron while O ₂ ²⁻ has no unpaired electron so it is diamagnetic.
292)	That molecule of Ne ₂ does not exist because: a. N _b > N _a b. N _b = N _a c. N _b < N _a d. None of these	B	The Ne ₂ molecule does not exist because its bond order is zero. Bond order is zero when N _b = N _a as bond order = $\frac{1}{2}(N_b - N_a) = \frac{1}{2}(2 - 2) = 0$
293)	Which information is obtained from bond order? a. Stability of the molecule b. Bond dissociation energy	D	Bond order a stability Bond order a $\frac{1}{\text{bond length}}$



	c. Bond length d. All of them		Bond order $\propto \frac{1}{\text{Dissociation energy}}$
294)	If there is one electron in each atomic orbital then in bond formation: a. Electrons will go to bonding molecular orbital b. Electrons will go to antibonding molecular orbital c. One electron will go to bonding and the other to antibonding molecular orbital d. The electron will stay in their own atomic orbitals	A	Electron from atomic orbital will go to bonding molecular orbital for bond formation because bonding molecular orbital have lower energy. So electrons tend to go first in bonding molecular orbitals.
295)	The bond formed between the two helium atoms will be: a. Sigma bond b. π bond c. Helium bond d. No bond will be formed	D	no bond will be formed as He_2 bond order is zero due to equal number of electrons in bonding and anti-bonding molecular orbitals.
296)	Which one contains the strongest carbon hydrogen bond? a. Ethane b. Ethene c. Ethyne d. Propane	C	The ethyne carbon is sp hybridized thus it is more electronegative and have more 's' character bond length $\propto \frac{1}{\text{'s' character}}$ bond length $\propto \frac{1}{\text{Bond strength}}$
297)	The C – C bond length is maximum in a. Ethane b. Ethene c. Ethyne d. Equal in all	A	The C – C bond length is maximum in ethane as it has a weaker single covalent bond sp^3 hybridized having less 's' character as Bond length $\propto \frac{1}{\text{Bond strength}}$ Bond length $\propto \frac{1}{\text{'s' character}}$ So, bond length of ethane is maximum
298)	Which of the following bonds required the largest amount of energy to dissociate into atoms concerned? a. Cl – Cl bond in Cl_2 b. C – C bond in C_2H_6 c. N = N bond in N_2 d. O = O in O_2	C	Bond dissociation energy depends on Bond dissociation energy a multiple of bond bond dissociation energy $\propto 1/\text{bond length}$
299)	If the sharing of an electron pair is	C	If the electronegative difference



unequal and the atom have an electronegativity difference of 1.4 to 1.6, what is this type of sharing called?

- a. Ionic
- b. Covalent
- c. Polar covalent
- d. Metallic

between 0.9 and 1.7 bond will be covalent and polar.

300)	Which one of the following is the most stable molecule? a. Thene b. Acetylene c. Propene d. 1 – Butene	B	Acetylene is the stable compounds as compare to alkenes (1-butene, ethane, propene) because they are less reactive towards electrophilic reaction as compare to alkenes. The pie electron cloud of alkyne make a cylindrical electron cloud around the triple bond make it more stable.
301)	The compound which contains both ionic and covalent bond is: a. CBr_4 b. KCN c. KCl d. H_2	B	KCN contains both covalent and ionic bonds. There is ionic bond between K^+ and CN^- ions and covalent bond between C and N in CN^- .
302)	The two fluorine atoms form a bond with each other, the bond will be: a. Sigma b. Sigma star c. π d. Pi star	A	A sigma bond is formed by the overlap of two p-orbitals linearly. The covalent bond between two fluorine atoms is a sigma bond formed by the overlap of two half filled 2p orbital one from each atom of fluorine.
303)	In which of the following does ionic bonding occur between the named atoms? a. Aluminium and chlorine in the trifluoride b. Boron and fluorine in boron trifluoride c. Hydrogen and chlorine in hydrogen chloride d. Hydrogen and sodium in sodium hydride	D	As the electronegativity difference between hydrogen and sodium atoms is 1.2 which is greater than 0.99 so it is ionic.
304)	Which one is the directional bonds? a. Covalent b. Coordinate covalent	D	Covalent, co-ordinate covalent bond and hydrogen bonds are directional in nature.



	c. Hydrogen bonding d. All of the above		
305)	Which of the following molecules has a net dipole moment? (a) CO ₂ (b) CS ₂ (c) SO ₂ (d) CCl ₄	(c)	SO ₂ molecule is an angular molecule with an angle less than 120°. Therefore the individual S-O bond moments cannot be cancelled out. In all other cases individual bond moments cancel each other effect giving zero dipole.
306)	Which of the following bonds is least polar? (a) H. Se (b) P Cl (c) H. Cl (d) N Cl	(d)	Polarity of a bond depends upon the difference in electronegativity of bonded atoms. ON moving across the periodic table from left to right, the electronegativity difference reduces and bond polarity reduces.
307)	During the formation of a chemical bond the potential energy of the system (a) Decreases (b) Increases (c) Does not change (d) None of these	(a)	The bond formation between the two atoms is the increase in attraction which means decrease in potential energy.
308)	In which of the following theories the hybridization is considered (a) VSEPR (b) Lewis (c) Molecule orbital (d) Valence bond	(d)	Atomic orbital hybridization gives a satisfactory explanation for valency of the elements. Valence bond theory tells the number of bonds made by atoms equal to their number of half filled orbitals. In certain cases the number of half filled orbitals for bond making is due to excitation of electrons. Excitation causes hybridization.
309)	The bond order for He ₂ molecule is (a) zero (b) 1/2 (c) 1 : (d) 2	(a)	Bond order = $\frac{\text{No. of electron in bonding molecular orbitals} - \text{No. of electron in antibonding molecular orbitals}}{2}$ For He ₂ the bond order = $\frac{2-2}{2} = \frac{\text{zero}}{2} = \text{zero}$
310)	The bond order O ₂ molecule is	(b)	The bond order of O ₂ (No. of electrons in B.M.O. – No. of electrons in



	(a) 1 (c) 3	(b) 2 (d) zero		$\text{B.M.O.}/2 = \frac{6-4}{2} = \frac{4}{2} = 2.$
311)	The C- C bond length in ethane (C_2H_6) is (a) 154 pm (c) 120 pm	(b) 133 pm (d) 105 pm	(a)	In C_2H_6 there is C---C single bond. And C---C single bond length is always 154 Pm.
312)	The C = C bond length in ethene (C_2H_4) is (a) 154 pm (c) 120 pm	(b) 133 pm (d) 105 pm	(b)	In C_2H_4 there is C = C double bond and its length is 133pm.
313)	The C≡C bond length in ethyne is (a) 154 pm (c) 120 pm	(b) 133 pm (d) 105 pm	(c)	The bond length when there is triple bond between two C-atoms is always 120pm.
314)	The bond between H – H is (a) Stronger than the bond between H --- Cl (b) Weaker than the bond between H ---- Cl (c) Neither stronger nor weaker than the bond between H --- Cl (d) None of these		(a)	H-atoms are small sized and are closer than H and Cl atoms in H ---- Cl.
315)	One of the causes of reactions is that the system attains the energy state which is of (a) Higher in energy (b) Lower in energy (c) Balanced in energy (d) Equal in energy		(b)	The bonds formed in the products are stronger i.e. stable bonds. These stable bonds are due to greater attractions which lower energy of the products.
316)	The polarity of molecule is expressed by (a) Bond strength (b) Dipole moment (c) Bond length (d) Shape		(b)	dipole moment is the vectorial sum of the individual bond moments in a molecule. Dipole moment of a molecule means that there is a net positive pole and a negative pole in the molecule.
317)	The electro-negativity difference for ionic bond must be greater than		(b)	In this case more than 50% the bond is ionic.



- (a) 1.6 (b) 1.7
(c) 1.8 (d) 1.0

318)	The VSEPER theory explains the _____ of molecules (a) Number (b) Kinds (c) Geometry (d) None	(c) Sidgwick and powell pointed out that the shapes of molecules could be represented by the number of electron pairs in the outer orbit of the central atom. These pairs are arranged at maximum distance apart given a definite shape to the molecule.
319)	The electro-negativity difference of H---Cl is 0.9 so it should be _____ bond (a) Covalent (b) Ionic (c) Coordinate covalent (d) Metallic	(a) The electronegativity difference is less than 1.7, hence the bond is covalent, but partially ionic i.e. polar.
320)	If two lone pairs are present then bond angle of tetrahedral compound reduces to _____ degrees (a) 109.5° (b) 107.5° (c) 104.5° (d) None	(c) The lone-pair lone pair repulsion is greater due to which the bond angle 109.5 (normal tetrahedral angle) contracts to 104.5°
321)	The energy of the non-bonding molecular orbital is _____ than bonding molecular orbital (a) lesser (b) Great (c) Equal (d) None	(b) Non-bonding molecular orbital is away from the nuclei. There is greater nucleus-nucleus repulsion which causes greater energy then that of bonding molecular orbital.
322)	A covalent bond may be (a) 100% covalent (b) Partially ionic (c) 100% ionic (d) Both a and b	(d) Covalent bond between two like atoms is 100% covalent whereas the covalent ond between two unlike atoms is partially ionic covalentond.
323)	The properties of a substance aare determined in a party by (a) Ionic bond (b) covalent bond (c) Hydrogen bond (d) Chemical bond	(d) The nature of chemical bond will tell us what kind of reaction are represented by that compound ionic bond present in the compound will give fast reactions of that substance.
324)	Formation of MgO is an example of (a) ionic bond (b) Covalent	(a) The electronegativity difference between Mg and O is 2.3 which is



	bond (c) polar bond (d) double covalent bond		greater than 1.7, hence the bond is ionic.
325)	The inter-nuclear distance are at which the energy of the two atoms bonded together is minimum as compared to the isolated atoms is called (a) Equilibrium bond distance (b) Bond length (c) Both a and b (d) None	(c)	When the two atoms approach distance of minimum energy, then the two atoms form a stable system and the distance between them is the compromise distance or bond length.
326)	Elements of group I and II combined with the elements of group Vi and VII to form (a) Ionic bond (b) Covalent bond (c) Polar bond (d) Polar covalent bond	(a)	I, II group elements have low ionization energies and Vi, VII group elements have high electrons affinities. The bond between them is ionic bond.
327)	The ionic bonds are (a) Unidirectional (b) Bi-directional (c) Non-directional (d) Multi-directional	(c)	The electrostatic force of attraction of a cation by oppositely charged ions is in all directions therefore ionic bond is in all directions or non-directional.
328)	The bond pair electrons remain between two nuclei and are called _____ electrons (a) Valance (b) Stable (c) Localized (d) None	(c)	The bond pair electrons are concentrated in the region between the two nuclei. Such pair is localized.
329)	The covalent compounds in non-polar solvents are _____ conductors of electricity (a) Good (b) Bad (c) Poor (d) Excellent	(b)	The these solutions carry no electric charge i.e. there are electrically neutral.
330)	The covalent bonds are (a) Unidirectional (b) Bi-directional (c) Non-directional	(d)	A polyvalent atom makes the covalent bond in different directions e.g. C in CH ₄ makes 4 covalents in tetrahedral manner.



(d) Multi-directional			
331)	The degree of polarity of molecule is known as its (a) Dipole moment (b) Moment arm (c) Bond energy (d) Ionic character	(a)	Dipole moment ($\mu = q \times r$) measures the strength of positive and negative poles in a molecule.
332)	PH_3 have _____ shape (a) Trigonal (b) Pyramidal (c) Tetrahedral (d) Linear	(b)	The P-atom is sp^3 hybridized with one lone pair like N in NH_3 . But there is one position occupied by lone pair. Therefore like NH_3 it has pyramidal shape.
333)	Which explain the over lapping of the bonding atomic orbitals? (a) VSEPPR theory (b) VB theory (c) MO theory (d) All	(c)	Atomic orbitals of the combining atoms overlap to form a set of molecular orbitals. These are bonding and antibonding molecular orbitals.
334)	The bond angle depends upon the (a) Types of bonds (b) Number of bonds (c) Non-bonding electron pairs (d) All of the above	(d)	The number of bonds made by the central atom of the molecule will represent the geometry of the molecule i.e the bond angles. Non-bonding Pairs also affect the bond angle, eg. In H_2O there are two lone pairs on O-atom which reduce the angle to 104.5° .
335)	The bond formed by pairing of electrons spin caused by the axial overlapping of half filled orbitals of two atoms is called (a) Sigma bond (b) Pi-bond (c) Ionic bond (d) None	(a)	The overlapping of half filled orbitals in one axis is called sigma bond.
336)	Fused ionic compounds (a) Insulators (b) Used as semiconductors (c) Conduct electricity (d) Do not conduct electricity	(c)	There is movement of ions in fused state of ionic compounds. Therefore these will conduct current.
337)	The sp^3 orbital are (a) Co-planer (b) non-planer	(b)	Sp^3 hybrid orbitals are oriented on the central atom in tetrahedral form with angle of 109.5° . that is why these are



	(c) Linear	(d) None	not co-planar
338)	Which of the following has highest bond order (a) O_2 (c) O_2^{-1}	(b) O_2^{+} (d) O_2^{-2}	(b) In O_2^{+} ion one electron is removed from antibonding molecular orbital, therefore the difference of electrons in bonding and antibonding orbitals become greater and bond order is greater.
339)	Which of the following statement is true? a. The number of MO's in a molecule equals twice the number of constituent atomic orbitals. b. As bonding MO's become more stable, antibonding MO's become equally less stable. c. In MO's, the number of bonding electrons equals the number of antibonding electrons. d. Each bonding MO can accommodate only one electron.		
340)	Predict the ideal bond angles around carbon in C_2I_2 using the molecular shape given by the VSEPR theory. a. 90° b. 109° c. 120° d. 180°	D	
341)	Valence bond theory predicts that carbon will use ----- hybrid orbitals in the carbonate anion, CO_3^{2-} a. sp b. sp^2 c. sp^3 d. sp^3d	B	
342)	For which one of the following molecules is the indicated type of	A	



hybridization not appropriate for the central atom?

- a. BeCl_2 sp^2
- b. SiH_4 sp^3
- c. BF_3 sp^2
- d. C_2H_2 sp

343) According to the molecular orbital (MO) theory, the twelve outermost electrons in the O_2 molecule are distributed as follows:

- a. 12 in bonding MOs, 0 in antibonding MOs,
- b. 10 in bonding MOs, 2 in antibonding MOs,
- c. 9 in bonding MOs, 3 in antibonding MOs
- d. 8 in bonding MOs, 4 in antibonding MOs

344) Bond order of the O_2^+ ion?

D

- a. 5.5
- b. 5
- c. 4
- d. 2.5

345) Ozone; a triatomic allotrope of oxygen has

- a. 0 resonance contributing structures
- b. 2 resonance contributing structures
- c. 3 resonance contributing structures
- d. 4 resonance contributing structures

346) Comparing the thermal stabilities of single, double and triple covalent bonds; the correct order is

- a. $\text{C}=\text{C} < \text{C}=\text{C} > \text{C}-\text{C}$
- b. $\text{C}=\text{C} < \text{C}=\text{C} < \text{C}-\text{C}$
- c. $\text{C}=\text{C} > \text{C}=\text{C} < \text{C}-\text{C}$
- d. $\text{C}=\text{C} > \text{C}=\text{C} > \text{C}-\text{C}$

347) Comparing the bond energies of hydrogen halides the correct sequence is



- a. $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$
- b. $\text{HF} < \text{HCl} > \text{HBr} < \text{HI}$
- c. $\text{HF} < \text{HCl} > \text{HBr} > \text{HI}$
- d. $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$

348) Comparing the bond lengths of C carbon-carbon bonds the correct sequence is

- a. $\text{C}-\text{C} < \text{C}=\text{C} < \text{C}\equiv\text{C}$
- b. $\text{C}-\text{C} < \text{C}=\text{C} > \text{C}\equiv\text{C}$
- c. $\text{C}-\text{C} > \text{C}=\text{C} > \text{C}\equiv\text{C}$
- d. $\text{C}-\text{C} > \text{C}=\text{C} < \text{C}\equiv\text{C}$

349) A covalent bond is considered non-polar if the electronegativity difference between the atoms is

- a. 0
- b. 0 to 0.3
- c. 0 to 0.6
- d. 0 to 0.9

350)

CHAPTER 4:

STATES OF MATTER.I. GASES

351) When an electric current is passes through neon gas, it produces:

- A)Plasma B)Light
- C)Both plasma and light
- d) plasma,light,sound

352) The collision of the gas molecules with the wall of the container is responsible for gaseous pressure. According to van der Waals (after pressure correction) which gas will exert more pressure if temperature is kept constant:

- A)Real gas B)ideal gas
- C)Non ideal gas D)All exert same pressure

353) Atmospheric pressure is measured by:

- A)Hygrometer
- B)Barometer



C)pyrometer

D)Spherometer

354)	Regarding liquefaction of gases, the highest temperature at a fixed pressure of; A)SO ₃ B)NH ₃ c) CL ₂ D)CO ₂	A	
355)	The equation used to describe the behavior of ideal gases under standard conditions; A)PV=nRT b)PM=dRT c) PVM=mRT D)All of the above	D	
356)	An unknown gas diffuses 5 times slower than that of H ₂ The molecular mass of the unknown gas is; A)50 b)10 c)15 D)25.	A	
357)	At constant temperature if the pressure of the gas is doubled its volume becomes. (a) One half (b) Double (c) Four times (d) Remains the same	A	
358)	According to Gay-Lusac's variation of the volume of a sample of gas, at constant pressure a straight line was obtained where slope was found to be equal to: (a) $\frac{V_1}{273}$ (b) $\frac{V_0}{273}$ (c) $\frac{P_1}{273}$ (d) $\frac{P_0}{273}$	B	
359)	If absolute temperature of the gas is doubled and pressure is increased 4 times, then the volume becomes: A) Half B) Double C) 4 times D) Unchanged	A	$T \propto V$ & $P \propto 1/V$
360)	At what temperature both Fahrenheit and Celsius scales coincide?	D	



	(a) 40°C (c) 32°C	(b) -30°C (d) -40°C		
361)	Which thermodynamic temperature is equivalent to 501.85°C?	A	$= C^0 + 273.15$ $K = 501.85 C^0 + 273.15 = 775.00K$	
	(a) 775.00 K (c) 228.85 K	(b) 774.85 K (d) 228.70 K		
362)	Which scientist made the following proposal equal volumes of gases under the same conditions of temperature and pressure contain the same number of particles	c		
	(a) Gay lussac (c) Dalton	(b) Curie (d) None of the above		
363)	At constant temperature, if the volume of the given mass of a gas is doubled, then the density of the gas becomes.	B		
	(a) Double (c) One quarter	(b) One half (d) Four times		
364)	In a closed room of 1000m ³ , a perfume bottle is opened up. The room develops smell. This is due to which property of gases?	A		
	(a) Diffusion (c) Density	(b) Viscosity (d) None of the above		
365)	A bottle of dry HN ₃ and a bottle of dry HCl connected through a long tube are opened simultaneously at both ends. The white NH ₄ Cl ring for Med will be	A	Because NH ₃ is lighter than HCl and will travel more distance.	
	(a) At the centre of the tube (b) Near the NH ₃ bottle (c) Near the HCl bottle (d) Throughout the length of the tube			
366)	Rate of diffusion on NH ₃ is 1.6 times faster than CO ₂ . The correct form of the rate law equation for this statement will be	B		



$$(a) \frac{rNH_3}{rCO_2} = \frac{1}{1.6} \quad (b) \frac{rNH_3}{rCO_2} = \frac{1.6}{1}$$

$$(c) \frac{rCO_2}{rNH_3} = \frac{1}{1.6} \quad (d) \text{None of these}$$

- 367)** If a single balloon is filled with equal volumes of hydrogen, helium, nitrogen, and neon, which gas will be depleted first?
 (a) Helium (b) Hydrogen
 (c) Nitrogen (d) Neon
- 368)** Consider an equation:
 $N_2 + O_2 \rightarrow 2NO$. The partial pressure (In atm) of N_2 under normal atmospheric pressure is:
 (a) 0.05 (b) 0.25
 (c) 0.35 (d) 0.45
- 369)** A mixture of 50g H_2 and 50g He has a total pressure of 1.5atm. what is the partial pressure of H_2 gas?
 (a) 1.0atm (b) 2.0atm
 (c) 1.5atm (d) 3.0atm
- 370)** 4.0 dm³ of O_2 at a pressure 800 atm and 1.0 dm³ of N_2 at a pressure of 100 atm are put into a 2.0 dm³ vessel. The total pressure in the vessel is:
 (a) 800atm (b) 600 atm
 (c) 900 atm (d) 200 atm
- 371)** Why does an ideal gas exert pressure on its container?
 (a) The molecules of the gas collide continually with each other.
 (b) The molecules of the gas collide in elastically with the walls of the container.
 (c) The molecules of the gas collide continually with the walls of the

B

D

Partial Pressure = $P = X P_0$

(n = 2 moles)

 P^0 = Total Pressure = 1atm

X = Mole fraction =

$$\frac{\text{Moles of Comp}}{\text{Total Moles in Mix}} = \frac{1}{2} = 0.5$$

$$P = X P_0 = 0.5 \times 1 = 0.5 \text{ atm}$$

Partial Pressure of N_2 = 0.45

A

$$P = X P^0$$

C

$$P_{\text{Total}} = P_1 + P_2 = 800 + 100 = 900 \text{ atm}$$

b



container.

(d) The weight of the molecules exerts a force on the walls of the container.

372)	40.0 dm ³ of an ideal gas at 25 ⁰ C and 750 mm Hg is expanded to 50.0 dm ³ . The pressure of the gas changed to 765 mm Hg. What is the temperature of the gas?	C	$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ $T_2 = \frac{P_1 V_1 T_1}{T_1 V_1} = \frac{(765)(50)(298)}{(750)(40)}$
	(a) $\frac{(2912)(750)(50)}{(40)(765)}$ (b) $\frac{(298)(750)(40)}{(50)(765)}$ (c) $\frac{(2912)(765)(50)}{(750)(40)}$ (d) $\frac{(298)(765)(50)}{(298)(765)(50)}$		
373)	The ideal gas equation is PV = nRT the symbol n in SI unit represents:	A	
	(a) The number of molecules in the gas (b) Avogadro's number (c) The number of kilo-moles (d) The number of molecules per unit volume		
374)	The volume occupied by 3.2 g of oxygen at STP is:	B	$n = \frac{m}{M} = \frac{3.2}{32} = 0.1 \text{ \& } n = \frac{V}{V_m} \Rightarrow V = n \times V_m = 0.1 \times 22.4 = 2.24$
	(a) 22.4 dm ³ (b) 2.24 dm ³ (c) 11.2 dm ³ (d) 16.0 dm ³		
375)	The internal energy of fixed cases of an ideal gas depends on:	B	
	(a) Pressure, but not volume or temperature. (b) Temperature, but not pressure or volume. (c) Volume, but not pressure or temperature. (d) Pressure and temperature, but not volume.		
376)	Which one of the following most closely resembles an ideal gas?	D	
	(a) Xe (b) H ₂ (c) CO ₂ (d) He		
377)	Real gases deviate more from ideal behavior at:	c	
	(a) High temperature only		



- (b) High pressure only
(c) High pressure and low temperature
(d) Low pressure and high temperature

378)	Which gas deviates most from ideal behavior at room temperature and pressure? (a) Hydrogen (b) Nitrogen (c) Methane (d) Sulphur dioxide	D	Deviation $\propto$ Polarity
379)	Equal volume of different gases under same condition of temperature and pressure contain the same number of particles. The above statement is of: (a) Avogadro's law (b) Graham's Law (c) Dalton's law (d) Hund's rule	A	
380)	The van der Waals equation of state for non-ideal gases differs from the ideal gas law in that it accounts for: The mass of each molecule of the gas. The volume of each molecule of the gas. The attractive forces between molecules of the gas. I, II and III (b) I and II only (c) I and III only (d) II and III only	D	
381)	Equal volume of CO and N ₂ are taken in identical conditions, the correct relation between masses of two gases is: A) CO < N ₂ B) CO > N ₂ C) CO = N ₂ D) N ₂ < CO	C	
382)	A flask contains 6 gram of hydrogen gas and 64 gram oxygen at r.t.p. the partial pressure of hydrogen gas in	B	



	the flask of the total pressure (p) will be: (a) $\frac{2}{3} p$ (b) $\frac{3}{5} p$ (c) $\frac{2}{5} p$ (d) $\frac{1}{3} p$		
383)	A gas diffuses $\frac{1}{2}$ times as fast as hydrogen gas its molecular mass is: (a) 32 a.m.u (b) 25 a.m.u (c) 8 a.m.u (d) 16 a.m.u	C	
384)	At absolute zero the molecules of hydrogen gas will have: (a) Only translational motion (b) Only vibrational motion (c) Only rotational motion (d) All the motion are ceased	B	
385)	If p is a pressure and δ is a density then p/δ has units of: (a) m^2/s^2 (b) N/m^2 (c) Kg/m^2 (d) m^3/Kg	A	
386)	At absolute zero the molecules of hydrogen gas will have: (a) Only translational motion (b) Only vibrational motion (c) Only rotational motion (d) All the motion are ceased	B	
387)	In a sample of air at $25^\circ C$ molecules of oxygen, nitrogen and CO_2 all move with different average speed. Which of the following lists the molecules in order of decreasing average speed? a. $CO_2 > O_2 > N_2$ b. $N_2 > CO_2 > O_2$ c. $N_2 > O_2 > CO_2$ d. $O_2 > CO_2 > N_2$	C	The order decreasing average speed is $N_2 > O_2 > CO_2$ As $r \propto \frac{1}{\sqrt{m}}$ Because gases of lower molecules mass will be the ability to move with high speed as CO_2 has molecular mass (44g) greater than O_2 (32 g) which has greater molecular mass than N_2 (28g). that is why they get the above decreasing order of average speed.
388)	When compared at the same pressure and temp. which one of the	C	At same temperature and pressure H_2 and D_2 will have the same value of



	following properties has the same value for H_2 and for D_2: - Density - Relative molecular mass - Average molecular kinetic energy - Rate of intermolecular collision		average molecular kinetic energy. It is in accordance with kinetic molecular theory of gases. As $K.E_{(avg)} \propto T_{(absolute)}$.
389)	An ideal gas cannot be liquefied because: - It solidifies before becoming liquid - Its critical temperature is always above $0^\circ C$ - Forces operate between its molecules are negligible - Its molecules are relatively smaller in size.	C	According to kinetic molecular theory of gases. The ideal gas molecules have negligible intermolecular forces and hence they can't be liquefied.
390)	Which of the following processes most clearly suggests that matter is made up of particles in continuous motion? - Combustion - Diffusion - Oxidation - Melting	B	According to kinetic molecular theory of gases the gas molecules are in random/continuous motion practically the process of diffusion mostly clearly suggest that the particles are in continuous motion.
391)	When 200ml of gas at constant pressure is heated from $0^\circ C$ to $100^\circ C$, the volume must be multiplied by: 0/100 100/0 273/373 373/273	D	Initial volume $V_1 = 200ml$ Initial temperature $T_1 = 0^\circ C = 273 K$ Final Temperature $T_2 = 100^\circ C = 373 K$ According to Charles's law $V_2 = \frac{V_1}{T_1} \times T_2 = 200ml \times \frac{T_2}{T_1}$ $V_2 = 200ml \times \frac{373K}{273K}$ So, the final volume (V_2) must be multiplied by $\frac{373K}{273K}$
392)	The product of PV of a gas is unit of: - Force - Entropy - Work	C	$PV = \left(\frac{N}{m^2}\right) (m^3) = Nm = J$ As joule is unit of work so PV of a gas has unit of work.



d. Immulse		
393)	A constant pressure, the initial volume at 0°C can be doubled at. a. 273 k b. 273°C c. -273°C d. None of these	B As $\frac{V_1}{V_1} = \frac{V_2}{V_2}$ $T_2 = V_2 \times \frac{T_1}{T_1}$ Now $V_2 = 2V_1$ So $0^\circ\text{C} = 273\text{ K}$ So $T_2 = 2V_1 \times \frac{273\text{K}}{V_1} \Rightarrow T_2 = 546\text{ K}$ or 273°C At 273°C the initial volume becomes double.
394)	At constant temperature the pressure of the gas is reduced to one third the volume: a. Reduces to one third b. Increases by three times c. Remains the same d. Cannot be predicated	B According to Boyle's law $V \propto \frac{1}{P} \Rightarrow K = PV = K = \frac{P}{3} \times 3V$ because K is constant for gas If pressure is decreased/reduced to one third volume will increase by three time
395)	In a closed flask of one litre, 2.0g of hydrogen gas is heated from 27°C to 37°C. which of the following is incorrect? a. The pressure of the gas increases b. The K.E. of gaseous molecules increases c. The rate of collision increases d. The number of moles of the gas increases	D The statement in option d is incorrect because it goes against the law of conservation of mass.
396)	Standard temperature and pressure (STP) of gas refers to: a. 273K and 76 mm Hg b. 273°C and 760 mm Hg c. 273K and 760 mm Hg d. 273°C and 76 mm Hg	C STP stands for standard temperature and pressure. Temperature = 273 K and pressure = 760 mm of Hg.
397)	Which one of the following is absolute zero? a. 0 K b. 20 K c. 273 K d. -273 K	A Absolute zero. This is the temperature at which the motion of the molecules become ceased.
398)	If you wish to find the corrected	C Generalized form of ideal gas



volume of a gas that was at 20°C and 1 atm pressure and conditions were changed to 0°C and 0.90 atm pressure, by what fractions would you multiply the original volume?

- $\frac{293}{273} \times \frac{1}{0.92}$
- $\frac{273}{293} \times 0.92$
- $\frac{293}{273} \times \frac{1}{0.92}$
- $\frac{293}{273} \times \frac{1}{0.92}$

equation is given by

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

If V_1 is the original volume

$$V_2 = V_1 \left(\frac{T_2}{T_1} \times \frac{P_1}{P_2} \right) \rightarrow (A)$$

As $P_1 = 1 \text{ atm}$ $P_2 = 0.91 \text{ atm}$

$$T_1 = 20^\circ\text{C} = (20 + 273) \text{ K} = 293 \text{ K}$$

Putting these values in eq (A)

$$V_2 = V_1 \left(\frac{273}{293} \times \frac{1}{0.92} \right)$$

Hence original volume will be multiplied by

$$\left(\frac{273}{293} \times \frac{1}{0.92} \right)$$

399) For one mole of a gas the ideal gas equation is

- $PV = RT$
- $PV = \frac{1}{2} RT$
- $PV = \frac{3}{2} RT$
- $PV = \frac{5}{2} RT$

As general gas equation is

$$PV = nRT$$

For $n = 1$

$$PV = RT$$

400) For given mass of 'a' if the pressure is reduced to half and temperature is doubled, then volume 'v' will be:

- 4v
- 2v
- v/4
- 8v

As $PV = RT$

For $n = 1$

$$As v = \frac{RT}{P}$$

New volume V'

$$v' = \frac{R \times 2T}{P/2}$$

$$V' = 4 \left(\frac{RT}{P} \right) = 4(V)$$

So, the volume will be 4V

401) The unit of R, the gas constant are

- $\text{Erg K}^{-1} \text{mol}^{-1}$
- $\text{Cal K}^{-1} \text{mol}^{-1}$
- $\text{Joule K}^{-1} \text{mol}^{-1}$
- All of these

These are the units calculated using different system of units like e.g. $K^\circ \text{mol}$ in CGS $K^\circ \text{mol}$ in FPS and $\text{Joule K}^\circ \text{mol}$ in SI system.

402) If absolute temperature is doubled and the pressure is increased to 4 times, the volume is:

- Half
- Double
- Four times
- Unchanged

As

$$\frac{PV}{T} = R$$

$$\Rightarrow V' = \frac{RT'}{P'}$$

If

$$T' = 2T \text{ \& } P' = 4P$$

$$V' = R \left(\frac{2T}{4P} \right) \Rightarrow V' = \frac{1}{2} \left(\frac{RT}{P} \right) \Rightarrow V' =$$

$$\frac{1}{2} V$$



			<i>So, volume becomes half</i>
403)	What is the volume of 4g of D hydrogen gas at RTP? a. 48 liters b. 48 dm c. 48000 cm^3 d. All of them		<i>RTP stands for room temperature and pressure (i.e. $T = 25^\circ C = 298K$ $V = 24dm^3$)</i> <i>Moles of $H_2 = \frac{4}{2} = 2$</i> <i>At RTP molar volume = $24dm^3$</i> <i>Moles = $\frac{\text{volume (dm}^3\text{)}}{\text{molar volume}}$</i> <i>Volume = $2 \times 24 = 48dm^3 = 48 \text{ Liter}$</i> <i>= $48000 cm^3$</i>
404)	The density of methane at 2atm pressure at $27^\circ C$ is: a. $26gdm^3$ b. $0.26gdm^3$ c. $1.3gdm^{-3}$ d. $0.13gdm^{-3}$	C	<i>As density $d = \frac{PM}{RT}$</i> <i>$P = 2atm$ $M_{CH_4} = 16g/mol$</i> <i>$R = 0.0821 dm^3 atm mol^{-1} K^{-1}$</i> <i>$T = 27^\circ C = 300K$</i> <i>$D = \frac{2atm \times \frac{16g}{mol}}{0.0821 dm^3 atm mol^{-1} K^{-1} \times 300K}$</i> <i>$D = 1.3gdm^3$</i>
405)	All the same temperature and pressure which of the following gas has the greatest density? a. CO_2 b. SO_2 c. Cl_2 d. He	C	<i>As density d is $d = \frac{m}{v}$</i> <i>So the gas with greater mass/mol will have greater density.</i> <i>One mole of Cl_2 has a mass of $71g/mol$ which is maximum in all the compounds given in question so its density is greatest.</i>
406)	Deviation of a gas from ideal behavior is maximum, at: a. Low temperature, low pressure b. Low temperature, high pressure c. High temperature, low pressure d. High temperature, high pressure	B	<i>Deviation from ideal behavior is maximum at high pressure and low temperature because at low temperature and high pressure the attractive forces get stronger which is the property of a non-ideal gas.</i>
407)	The deviation of a gas from ideal behavior is maximum at: a. $-10^\circ C$ and 5.0 atm b. $-10^\circ C$ and 2 atm c. $100^\circ C$ and 2.0 atm d. $0^\circ C$ and 2 atm	A	<i>The deviation of a gas from ideal behavior is maximum at high pressure and low temperature. Because at high pressure and low temperature the attractive force get developed in gas molecules.</i>
408)	The compressibility factor, Z for an ideal gas is:	D	<i>The compressibility factor is given by the equation</i>



	a. Zero b. Less than 1 c. Greater than 1 d. Equal to one		$\frac{PV}{nRT} = Z$, for ideal gas $\frac{PV}{nRT} = 1$
409)	Which pair of gases do not obey Dalton's law of partial pressure? a. H ₂ and He b. H ₂ and O ₂ c. N ₂ and O ₂ d. NH ₃ and HCl	D	<i>As Dalton's law is applied where there is a mixture of non-reacting gas. While NH₃ and HCl are reactive with each other that is why they do not obey Dalton's law of partial pressure.</i>
410)	Mathematically Dalton's law of partial pressure is shown as a. $P = Kn$ b. $V = Kn$ c. $\frac{V}{T} = K$ d. $PV = K$	A	<i>According to Dalton's law, where a mixture of gas is enclosed in a container each gas exerts the same pressure as it would exert if it occupied the volume of the container alone at the same temperature. Mathematically $P = Kn$ Where P is the pressure and n is the number of moles of gases.</i>
411)	Partial pressure of gasses in a mixture depend upon: a. Number of moles b. Number of protons c. Number of electrons d. Number of neutrons	A	<i>As Dalton's law of partial pressure is $P = Kn$ Partial pressure is directly related with number of moles of gases.</i>
412)	Which statement explains why the compounds propane (C ₃ H ₈) and CO ₂ diffuses at the same rate at STP? a. They are both gases b. They have the same relative molecular mass c. Both are denser than air d. Their molecules contain carbon	B	<i>Because they both have same molecular masses. Let say both have molecular mass equal to M since Graham's law of diffusion mathematical form is</i> $\frac{r_{C_3H_8}}{r_{CO_2}} = \sqrt{\frac{M}{M}} = 1$ $r_{C_3H_8} = r_{CO_2}$ <i>So, both have same rate of diffusion due to same molecular masses.</i>
413)	A gas diffuses $\frac{1}{2}$ times as fast as hydrogen, its molecular weight is: a. 50 amu b. 25 amu c. 25.29 amu	D	<i>Since Graham's law of diffusion</i> $\frac{r_x}{r_{H_2}} = \sqrt{\frac{M_{H_2}}{M_x}}$ <i>Where r_x and M_x are the rate of</i>



d. 8 amu

diffusion and molar mass of unknown gas x .

While r_{H_2} and M_{H_2} are the rate of diffusion and molar mass of H_2

$$\Rightarrow \frac{1}{2} = \sqrt{\frac{2}{M_x}} = \frac{1}{4} = \frac{2}{M_x}$$

$M_x = 8$ amu So, the unknown gas will have a molecular mass of 8 amu

414)	Which gas would diffuse at the slowest rate? a. SO_2 b. NH_3 c. CO d. H_2	A	From Graham's law of diffusion $R \propto \frac{1}{\sqrt{M}}$ i.e. The gas with smaller molecular mass will have higher rate of diffusion. Molecular mass of SO_2 is 64 g/mol so it diffuses at the slowest rate.
415)	In liquification of gases cooling happens under the Joule Thomson effect due to sudden: a. Contraction b. Expansion c. Absorption d. All of these	B	Sudden expansion of gas produces cooling due to which gas is liquefied. When compressed gas is allowed to expand suddenly its molecules move away from each other. This process gets energy from the molecules of the gas due to which cooling occurs. This process is repeated several times and as a result liquification occurs.
416)	The negative Joule Thomson effect is shown in: a. Hydrogen b. Helium c. Oxygen d. Both a and b	D	Helium and hydrogen show negative Joule Thomson effect because of the long-range force in these gases are usually weak. It is difficult to create attractive forces in them.
417)	What is the kinetic energy of 2 moles of nitrogen at 27 degrees Celsius a. 8×10^3 J b. 8.2 KJ c. 7.4 KJ d. None	C	$N = 2$ moles $T = 27^\circ + 273 = 300$ K Thus $K.E = \frac{3}{2} nRT = \frac{3}{2} \times 2 \times 8.314 \times 300$ $= 7482.61 = 7.4 \times 10^3 = 7.4$ KJ
418)	What is the ratio of V_{rms} to V_{mp} velocities of a gas at a given temperature is a. $\sqrt{\frac{3}{2}}$	A	As $\frac{v_{rms}}{v_{mp}} = \frac{\sqrt{3RT/m}}{\sqrt{2RT/m}} = \frac{\sqrt{RT/m \times 3}}{\sqrt{RT/m \times 2}} = \frac{\sqrt{3/2}}{\sqrt{2}} = \sqrt{3/2}$



- b. $\sqrt{\frac{2}{3}}$
 c. $\sqrt{\frac{1}{2}}$
 d. $\sqrt{\frac{4}{5}}$

- 419)** At what temperature the rms speed of methane molecules will be same as the rms speed of He molecules at 127°C
- a. 1200 K
 b. 1600 K
 c. 200 K
 d. 2400 K
- 420)** The order of the rate of diffusion of gases NH₃, SO₂, Cl₂ and CO₂ is
- (a) NH₃ > SO₂ > Cl₂ > CO₂
 (b) NH₃ > SO₂ > SO₂ > Cl₂
 (c) Cl₂ > SO₂ > CO₂ > NH₃
 (d) None of these
- 421)** Pressure remaining constant at which temperature the volume of gas will become twice of what it is at 0°C
- (a) 545°C (b) 200°C
 (c) 546 K (d) none of these
- 422)** If absolute temperature of a gas is doubled and the pressure is reduced to one half the volume of gas will
- (a) Remain unchanged
 (b) increases four times
 (c) reduce to 1/4th
 (d) be doubled
- 423)** The molar volume of CO₂ is maximum at
- (a) STP (b) 127°C and 1 atm
- 419) B** According to condition
 V_{rms} of methane at $T = v_{rms}$ of He at 400L
- $$\frac{\sqrt{3RT/m}}{\sqrt{M_{CH_4}}} = \frac{\sqrt{3RT}}{\sqrt{M_{He}}}$$
- $$\sqrt{\frac{3RT}{m}} = \sqrt{\frac{3R \times 400}{4}}$$
- $$\frac{T}{16} = 100 = 1600 \text{ K}$$
- 420) (b)** Rate of diffusion of gases are inversely proportional to the square root of the molecular masses of gasses. Lighter the gas, greater is its rate of diffusion.
- 421) (c)** The volume of the gas increases or decreased by $\frac{1}{273}$ of its original volume at 0°C by 1°C rise Or fall in temperature. Therefore at 273°C the volume of gas is doubled of the volume at 0°C, and 273°C = 546K.
- 422) (b)** By doubling the Kelvin temperature the volume is also doubled. And if pressure is reduced to half it also increase twice the volume
- 423) (d)** High temperature and low pressure increase the volume of the gas.



(c) 0° and 1 atm (d) 273°C and 1 atm

424)	The deviation of a gas from ideal behavior is maximum at (a) -10°C and 5.0 atm (b) -10°C and 2.0 atm (c) 100°C and 2.0 atm (d) 0°C and 2.0 atm	(a)	Real gases deviate more from ideal behavior at low temperature and under high pressure.
425)	At high temperature isotherm moves away from both the axes because of increase in (a) pressure (b) volume (c) no of moles (d) all above	(b)	Isotherm is a curves or graph plotted between pressure and volume of a given mass of gas at the constant temperature. Increase in temperature increases the volume. That is why the values of volumes at all pressures are higher and the curve goes away from both axes.
426)	Which of the following has same number of molecules at STP (a) 1000 cm ³ of N ₂ H ₄ and O ₂ (b) 200 cm ³ of CO ₂ and N ₂ O (c) 50 cm ³ each of CO and N ₂ (d) All above	(d)	According to Avogadro's law equal volumes of all gases under same temperature and pressure contain equal number of molecules.
427)	Density of a gas is usually expressed in (a) kg m ³ (c) g dm ³ (b) Kg dm ³ (d) gcm ⁻³	(c)	As gases occupy all the available space, therefore volume for density measurements is in dm ³ , and the quantity of gases is in grams.
428)	Concept of distribution of velocities among the gas molecules was developed by (a) Celsius (b) Maxwell (c) Boltzman (d) Vanderwall	(b)	Maxwell's law of distribution of velocities.
429)	Absolute temperature of a gas is proportional to (a) Translational kinetic energy (b) Rotational kinetic energy (c) Vibrational kinetic energy	(a)	According to equation $E_k = \frac{3}{2} R/NA.T$, the Kelvin temperature is directly proportional to the average translational kinetic energy of its molecules.



(d) Potential energy

430)	Most ideal gas at room temperature is (a) CO ₂ (c) SO ₂	(b) NH ₃ (d) N ₂	(d) N ₂ gas is liquified at -196°C, while others liquify at higher temperatures there at room temperature N ₂ molecules are far apart behaving more idea.
431)	A real gas obeying Vander Wall's equation will resemble ideal gas if (a) Both a and b are large (b) Both a and b are small (c) A is small and b is large. (d) A is large and b is small	(b)	The least values of 'a' and 'b' factor will represent the non-polar character of the gas behaving more idea.
432)	Argon has low critical temperature and pressure due to its. (a) Small size (b) Monoatomic molecule (c) Low polarizability (d) Liquefaction temperature to close to room temperature	(c)	Ar is noble gas having only weak Vander Waals forces. Ar being non-polar molecule has low polarizability.
433)	All gases liquefly before reaching at (a) 273°K (c) 0K	(b) 373°K (d) 73°C	(d) 0 K is the lowest temperature. All gases liquefly before 0K
434)	Kinetic energy associated with one molecule of gas due to translational motion is given by (a) $E_k = 1/2 mc^2$ (c) $E_k = 1/3 mc^2$ $E_k = 3R/2NA \times T$	(b) $E_k = 1/2 mv^2$ (d)	(a) EK is the average translational kinetic energy of gas molecules. For 1 molecule it is $\frac{1}{2} mc^2$.
435)	Weight of one dm ³ of O ₂ at STP is (a) 1.4384 gm 1.4394gm (c) 1.6384 gm	(b) 1.3384gm (d)	(a) 22.414 dm ³ O ₂ at STP = 32 grams (1 mole) 1 dm ³ O ₂ at STP contains O ₂ gas $= \frac{32}{22.414} g = 1.4384 \text{ grams.}$
436)	Which is not the state of matter? (a) plasma (c) gas	(b) solid (d) None	(d) Solid, gas and plasma are the states of matter.
437)	One atmosphere is equal	(b)	The S.I. unit of pressure is expressed in Nm ⁻² . 1 atmosphere = 101325 Nm ⁻²



	_____ pascal		² and 1 Pascal = 1Nm ⁻²
	(a) 760	(b) 101325	Therefore 1 atmosphere = 101325 Pa.
	(c) 14.7	(d) 1.01325	
438)	$PV = \frac{1}{3}mNC^2$ is the equation for	(b)	R.J. Clausius deduced an expression for the pressure of an ideal gas from kinetic molecular theory of gases. He derived the equation called kinetic equation. $Pv = \frac{1}{3}mNC^2$
	(a) Dalton's law	(b) Kinetic gas equation	
	(c) Both a and b	(d) None	
439)	For a gas the isotherm is the graph between	(d)	Isotherm means graph between P and V when heat is constant i.e. temperature is constant.
	(a) V and T	(b) T and P	
	(c) n and T	(d) P and V	
440)	The gas law are not obeyed by general gases at	(d)	At low temperature and high pressure the gas molecules are closer having attractive forces. Then gases exhibit non-ideal behaviour i.e. do not obey the gas law.
	(a) low temp	(b) high pressure	
	(c) high temp.	(d) both a and b	
441)	Which is correct?	(c)	Units of pressure.
	(a) 1 mm Hg = 1 torr = 1 atm		
	(b) 1mm Hg = 760 torr = 1 atm		
	(c) 760 mm Hg = 760 torr = 1 atm		
	(d) 760 mm Hg = 1 torr = 1 atm		
442)	Absolute zero is equal to	(b)	The lowest temperature is -273°C, thus called as absolute zero.
	(a) 273°C	(b) -273°C	
	(c) -273°K	(d) -273°F	
443)	S.I. Units for measurements of pressure	(a)	The S.I. unit for pressure in Nm ⁻² and 1 Nm ⁻² = 1 pascal.
	(a) pascal	(b) mm of Hg	
	(c) atm	(d) Torr	
444)	V a 1/P is mathematical expression for	(c)	It is definition of Boyle's law.
	(a) Charle's law	(b)	
	Avogadro's law		
	(c) Boyle's law	(d) Brown's	



	law		
445)	Mathematical expression for Charle's law is (a) $v \propto t$ (b) $V/T = \text{constant}$ (c) Both a and b (d) $V \propto 1/t$	(c)	According to definition of Charle's law.
446)	The spontaneous homogenous mixing of molecules of different gases by random motion and collisions called (a) Diffusion (b) Effusion (c) Dalton's law (d) None	(a)	The spontaneous mixing of one gas molecules into the other gas molecules is called diffusion.
447)	Equal volumes of all gases at STP contains equal no of molecules is called (a) Dalton's law of partial pressure (b) Graham's law of diffusion (c) Avogadro's law (d) None	(c)	It is definition of Avogadro's law.
448)	Barometer is used to determine (a) pressure (b) Absolute temperature (c) KE (d) Length	(a)	Barometer is an instrument used for measuring atmospheric pressure.
449)	Absolute zero is equal to (a) 0°C (b) -459.7°F (c) -273°K (d) None	(b)	According to the formula $C^{\circ} = 5/9 (F - 32)$ Temperature in $C^{\circ} = 5/9 (-459.7)$ (a) 0°C (b) 459.7°F $= 5/9 (-459.7) = 5(-51.1) = -255.5$ $= 5/9 (-491.7) = 5(-54.63) = -273.15^{\circ}\text{C}$. (c) 273°K (d) None And 273.15°C is called Absolute zero.
450)	Sudden expansion of a gas causes cooling this phenomenon is called (a) Condensation (b) Sublimation (c) Joule Thomson effect	(c)	When highly compressed gas is allowed to expand rapidly into a region of low pressure. the molecules consume their energy. The decrease in kinetic energy of gas molecules causes cooling. It is Joule Thomson



(d) Evaporation		effect.
451)	What is the ratio of rate of diffusion of equal vol. of NH_3 and CO_2 ? (a) 1.2 (b) 1.6 (c) 1.0 (d) 2.1	(b) According to Postulate of kinetic molecular theory of gases "the kinetic energy of the gas molecules varies directly as the absolute temperature of gas."
452)	K.E.G a T is expression for (a) boyle's law (b) Charle's law (c) Kinetic molecular theory (d) None	(c) According to postulate of kinetic molecular theory of gases "the kinetic energy of the gas molecules varies directly sa the absolute temperature of gas."
453)	If $V_1 = 5$ litters, $P_1 = 2$ atm, $T_1 = 273^\circ\text{C}$, $T_2 = 0^\circ\text{C}$ and, $V_2 = ?$ When $P_2 = 1$ atm. (a) 5 lit (b) 10 lit (c) 2.5 lit (d) 12.5 lit	(?) $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ or $\frac{2 \times 5}{546} = \frac{1 \times V_2}{273}$ or $V_2 = 5$ litres.
454)	What is the weight of 10 litres of CO_2 at 27°C and 2 atm? (a) 89.39 (b) 36.1 g (C) 125 g (d) 127 g	(b) $PV = nRT$ or $N = \frac{PV}{RT} = \frac{2 \times 10}{0.0821 \times 300} = 0.82 \times 44 = 36.08 \text{ g}$
455)	What is ratio of diffusion of NH_3 and HCl ? (a) 1.6 (b) 1.7 (c) 2.0 (d) 1.5	(d)
456)	The rate of diffusion of lighter gases is _____ than heavier gases (a) More (b) Less (C) Equal (d) None	(a) Rate of diffusion is inversely proportional to the square root of their molecular masses. Lighter the gas more is the rate of diffusion.
457)	Intermolecular forces are ----- than binding forces (a) Stronger (b) Equal (c) Weaker (d) None	(c) The binding forces are the bonds between the atoms or ions. And the bonds are more strong than the intermolecular forces as the bonds remain as such when molecules evaporate or go father from each



		other.
458)	Different gases with same K. E. move with ----- velocities (a) Same (b) Different (c) Equal (d) None	(b) $K.E. = \frac{1}{2}mV^2$. Different gases have different molecular masses. If their kinetic energies are same, then their velocities will be different have same K.E.
459)	The collisions between gas molecules are (a) Elastic (b) Inelastic (c) Both a and b (d) None	(a) There is no loss or gain of energy on collision of the molecules. The average energy of the pair remains unchanged.
460)	Air is a mixture of N ₂ , O ₂ Ar and CO ₂ . The total pressure of air is 760 mm of Hg. Gas having highest partial pressure in air is; a. N ₂ b. O ₂ c. Ar d. CO ₂	A
461)	Van der Wall constant 'a' depends on the intermolecular forces among gas molecules. Comparing the following gases which one will have highest value for 'a'. a. N ₂ b. H ₂ c. He d. CH ₄	D
462)	A student found that critical temperature of sulfue dioxide is very high as compared with that of carbon dioxide. His class teacher told him that the reason is; a. Grater mass of SO ₂ b. Polarity of SO ₂ c. Less molar mass of SO ₂ d. The bonding situation in SO ₂	B
463)	A late comer student was standing outside of the lecture room. He heard just a few words of his professor 'flat screen of television, neon sign and sun'. the first idea	D



which may come to the late comer's mind is;

- a. Liquid-crystals
- b. Discharges tube
- c. Gases
- d. Plasmas

- | | | |
|------|--|---|
| 464) | Keeping the temperature of the gas constant, if volume of a gas is 10L at 1 atm pressure, its volume will be . 2.5L at | B |
| | a. 2 atm | |
| | b. 4 atm | |
| | c. 0.25 atm | |
| | d. 0.125 atm | |
| 465) | If pressure on a gas is kept constant, its volume increases from 25L to 50L, the corresponding increase in its temperature is from 27°C to | D |
| | a. 54°C | |
| | b. 13.5°C | |
| | c. 200°C | |
| | d. 327°C | |
| 466) | At constant temperature and pressure volume of a gas is directly proportional to its. | D |
| | a. pressure | |
| | b. temperature | |
| | c. number of atoms | |
| | d. number of moles | |
| 467) | Which one among the following postulate of kinetic molecular theory needs correction at high pressure? | D |
| | a. There are no forces of attraction or repulsion among gas molecules | |
| | b. Force of gravity has no effect on the motion of the gas molecules | |
| | c. At the same temperature, all gas molecules have the same average kinetic energy | |
| | d. Actual volume of a gas is | |



negligible as compared with its occupied volume.

468)	In the van der Waals equation, the term n^2s/V^2 shows that the attractive forces between molecules are a. Not zero b. Zero c. Negligible d. Comparable	A	
469)	Comparing the polarity and molar mass which one among the following gases has highest critical temperature. a. O ₂ b. CO ₂ c. SO ₂ d. N ₂	C	
470)	The plasma produced from nitrogen and oxygen has a. Negative charge b. Positive charge c. No charge d. Positive or negative charge depending on the conditions.	C	
471)	All of the following are the examples of plasma except. a. Neon sign b. Sun c. Lightning d. Molten mercury	D	
472)	Rate of diffusion of helium is four times that of a. N ₂ b. O ₂ c. SO ₂ d. NH ₃	C	
473)	Which one among the following gaseous mixtures will have the same number of molecules? a. 22g of CO ₂ and 1g of H ₂ b. 16g of O ₂ and 16g of CH ₄ c. 28g of N ₂ and 14g of CO	a	



d. 2g of H_2 and 48g of O_2

- 474) Linde's method is a method for the d
- a. Determination of the molecular gas of a gas
 - b. Measurement of partial pressure of a gas
 - c. Characterization of a gas
 - d. Liquefaction of a gas

475)

CHAPTER 5+6

STATE OF MATTER. LIQUIDS + solids

- 476) The compound with most exothermic lattice energy is: C
- A. $CaCl_2$ B. K_2O
C. CaO D. $BaCl_2$

- 477) Choose the anisotropic behavior; A
- A. Coefficient of thermal expansion
B. Lattice energy
C. Viscosity
D. Infrared spectroscopy

- 478) Amorphous solids are made by fusing silicates with: D
- A. Boric acid
B. Aluminum oxide
C. Phosphorus pentoxide
D. All of the above

- 479) Compound with a greater number of hydrogen bonding is: B
- A) CH_3OH B) H_2O
C) CdS D) H_2SO_4

- 480) The liquid with highest rate of evaporation among the following is: B
- A) Water B) Ethyl alcohol
C) Ammonia D) N-pentane

- 481) All are anisotropic at room temperature except; A
- A) CCl_4 B) $AgNO_3$



	C) CdS D) BaCO ₃	
482)	At a temperature of -10 °C which one doesn't have the property of molecular crystal among the following is: A) Phosphorous B) Water C) Sucrose D) None of the above	D
483)	Evaporation depends upon' A) Surface area B) Temperature C) Both (A) & (B) D) None of the above	D
484)	Hydrogen bonding in H-F is stronger than H ₂ O and NH ₃ . The highest boiling point among the three; A) HF B) NH ₃ C) H ₂ O D) All have equal boiling points.	C
485)	In which of the following compounds hydrogen bonding is possible? (a) PH ₃ (b) CH ₄ (c) NH ₃ (d) SiH ₄	C
486)	Cleaning action of soap is due to: (a) Decrease in surface tension of water (b) Viscosity of water (c) High boiling point of water (d) Polarity of water	A
487)	What type of intermolecular attractive force are present in CO ₂ ? (a) Hydrogen bonding (b) Dipole-dipole interaction (c) London forces (d) Covalent bonding	C
488)	Which is true about London forces? (a) London forces are present in non-polar molecules (b) London forces are present in	



	polar molecules (c) London forces are created between instantaneous dipole and induced dipole (d) All of the above.		
489)	London dispersion forces (forces between the particles) are present in: (a) Gases only (b) Liquids only (c) Solids only (d) All of the above	D	
490)	Evaporation occurs at: (a) All temperature (b) Low temperature (c) High temperature (d) Absolute temperature	A	
491)	The lowest vapor pressure is exerted by. (a) Water (b) Kerosene oil (c) Mercury (d) Rectified spirit	C	
492)	Choose the correct statement: (a) crystalline solids are usually anisotropic but liquid crystals are isotropic. (b) crystalline solids are usually isotropic but liquid crystals are anisotropic. (c) liquid crystals have both isotropic and anisotropic properties (d) liquid crystals are devoid of isotropic and anisotropic properties.	A	
493)	The shape or appearance in which a crystal grows is called: (a) Crystal geometry (b) Crystal lattice (c) Crystal habit (d) None of the above		
494)	The existence if a substance in more than one solid modification is know as: (a) Isomorphism (b)	C	



	Amporhism (c) Polymorphism (d) None of the above		
495)	KNO ₃ exists in two crystalline forms Rhombohedra and orthombic the phenomenon is known as: (a) Polymorphism (b) Isomorphism (c) Allotropy (d) None of these	A	
496)	Choose the correct statement: (a) Ionic solids exist in the form of molecules (b) Ionic solids have high volatility (c) Ionic solids exist in the form of liquids and (d) Ionic solids have high melting points and boiling points	D	Ionic solid never exists in the form of liquids or gases
497)	Which one of the following characteristics is not usually attributed to ionic substances? (a) High melting point (b) Deform when struck (c) Fragility (d) Crystalline	c	
498)	The electrical conductivity of NaCl crystal is: (a) More than NaBr crystal (b) Les than NaBr crystal (c) Equal to NaBr crystal (d) NaCl crystal doesn't conduct electric current	d	
499)	The type of intermolecular forces (force between the particles) present in solid mercury is: (a) covalent bonds (b) Ionic Bonds (c) Metallic bonds (d) H-bonds	c	
500)	Both NaNO ₃ an CaCO ₃ crystallize in Rhombohedral forms therefore they are: (a) Allotropes (b) Polymorphous (c) Isomorphous (d) None of	D	Different crystalline solids having same crystal shape are called isomorphs.



these

- 501)** Pure water freezes at 0°C and boils at 100°C at standard conditions. Calcium chloride was added to pure water. What do you expect about its freezing point and boiling point:
(a) No change in its freezing point and boiling point
(b) Freezing point increases and boiling point decreases.
(c) Freezing point increases and boiling point increases
(d) Freezing point decreases and boiling point increases **D**
- 502)** Hydrogen bonding do not exist in the molecule of:
(a) Hydrogen (b) Proteins
(c) Carbohydrates (d) Ammonia
- 503)** Vapour pressure of a liquid can be measured by the Barometric method and Manometric:
(a) Barometric method is more accurate than Manometric method.
(b) Manometric method is more accurate than Barometric method.
(c) Both are equally accurate and applicable.
(d) Both methods are in use but are not reliable.
- 504)** Liquid crystalline substances are used to locate tumors in the body because:
(a) These parts of the body are warmer than the surroundings.
(b) These parts of the body are cooler than the surroundings.
(c) These parts of the body are constantly increasing and decreasing with the temperature.
(d) None of the above
- 505)** Sodium chloride crystal structure is:
(a) Hexagonal (b) Body



	centered cubic (c) Face centered cubic(d) Tetragonal	
506)	Choose the compound in which hydrogen bonding is not possible: (a) H_2O (b) HCl (c) CH_3COOH (d) CH_3OCH_3	Compounds having F, O & N atoms can form hydrogen bonding.
507)	Atomic size of xenon is larger than Neon. Considering the London dispersion forces which one of the following is true. (a) Neon molecules have weaker London dispersion forces (b) Xenon molecules have weaker London dispersion forces (c) Xenon and Neon have almost same London dispersion forces (d) Xenon have lower boiling point than neon	A
508)	The heat of vaporization of the liquid A, B and C are 60, 30 and 40 kcal/mole respectively the order of decreasing inter molecular forces among their molecules is: (a) $A > B > C$ (b) $C > B > A$ (c) $A > C > B$ (d) $B > C > A$	C
509)	Graphite is one of the allotropic form of Carbon it is: (a) Isotropic (b) Anisotropic (c) Bond conductor of electricity (d) Both (b) & (c)	B
510)	Distillation under reduced pressure is used to purify liquids which (a) Are explosive (b) Are highly volatile (c) Decompose at their boiling point (d) Have high boiling point	D vacuum distillation decrease the time of distillation and also avoid thermal decompositions of many compounds like glycerine.



511)	Which one of the following contains maximum hydrogen bonding? a. H_2O b. HF c. NH_3 d. $\text{C}_2\text{H}_5\text{OH}$	A	<i>In water the oxygen has 2 lone pairs and 2 hydrogen atoms. With another neighbour water molecule. It can make four hydrogen bonds. While HF and NH_3 form two hydrogen bonds with neighbor molecule, also in $\text{C}_2\text{H}_5\text{OH}$ it forms 2 hydrogen bonds with another $\text{C}_2\text{H}_5\text{OH}$.</i>
512)	When two ice cubes are passed over each other, they unite to form one cube. This is due to: a. Covalent attraction b. Hydrogen bond formation c. Ionic bond formation d. Metallic bond formation	B	<i>As ice has H-bonding in its molecules that is why when one cube is passed over another, they unite to form one cube. They are united by hydrogen bonding.</i>
513)	Which statement is correct about liquid crystal? a. They have some degree of order like solids b. They have fluidity like liquids c. They have properties such as surface tension, viscosity etc like liquids d. All statements are correct.	D	<i>All the given statements are describing its properties.</i>
514)	Which one is liquid crystal? a. Stearin b. DNA c. Cholesteryl benzoate d. All of them	D	<i>DNA when placed in a solution of salt and water becomes liquid crystal. Cholesteryl benzoate is also liquid crystal because it forming cholesteric liquid crystal with helical structure. Stearin is also liquid crystal.</i>
515)	Which one of the following is more temperature sensitive? a. Ionic crystal b. Covalent crystal c. Liquid crystal d. Metallic crystals	C	<i>Liquid crystals are sensitive to temperature. That is why they are used in temperature sensitive devices like thermometer to measure the temperature.</i>
516)	Which one is used as a solvent in liquid-solid chromatography? a. Liquid crystals b. Ionic crystals c. Metallic crystals d. Covalent crystals	A	<i>Chromatography (a laboratory technique used to separate mixture of a substance into its components) uses liquid crystal as a solvent in liquid-solid chromatography.</i>



517)	Which one is the most accurate method for the measurement of vapour pressure? a. Barometric method b. Manometric method c. Stalagmometric method d. Capillary method	B	Manometric method is the accurate and more effective used for the measuring of vapour pressure.
518)	The vapour pressure of liquid at a given temperature is given by: a. $\frac{n}{v} RT$ b. $\frac{n}{v} RT^2$ c. $\frac{n}{2v} RT$ d. $\frac{n}{v} RT^3$	A	As, $PV = nRT \Rightarrow P = \frac{n}{V} RT$ This formula can be used to calculate the vapor pressure of a liquid
519)	Distillation of water cannot remove; a. Volatile liquids like alcohol b. Dissolved salts c. Suspensions d. Precipitates	A	Distillation of water cannot remain volatile liquids.
520)	Which statement is incorrect about 'vacuum distillation'? a. It increases the time for distillation b. It is economical c. It avoids thermal decomposition of liquids having very high boiling points d. All are correct	A	Vacuum distillation actually decreases the time of distillation by lowering the boiling point through reducing pressure.
521)	Stalagmometer is used to measure? a. Surface tension b. Viscosity c. Vapour pressure d. Dipole moment	A	Stalagmometer is used to measure surface tension. This device is a capillary glass tube whose middle section is widened. The lower end of the tube is narrowed to force the fluid to fall out of the tube as a drop. Surface tension is found by formula $Rl = \frac{nwdl}{nldw} \times r_w$ Where r_l , d_l and n_l are surface tension, density and number of drops of given liquid and r_w , d_w and n_w are the surface tension, density and



			<i>number of drops of water.</i>
522)	Water has high surface tension because of: a. Hydrogen bonding b. Ionic bond c. Metallic bond d. All of them	A	Surface tension is high when intermolecular forces of a liquid are stronger. Due to strong h-bonding in water molecules, water has high surface tension.
523)	The S.I unit of surface tension is: a. Nm^{-1} b. Jm^{-2} c. both a and b d. Nm^{-2}	C	Mathematically surface tension is force applied on a liquid to the length d along with the force F acts. So, $\text{Surface tension} = \frac{F}{d} = \frac{\text{N}}{\text{m}}$ So, its unit is Nm^{-1} or $\frac{\text{J}}{\text{m}^2}$
524)	Which method is employed for measuring surface tension of liquids? a. Torsion method b. Capillary method c. drop method d. all of them	D	All these techniques are used to measure the surface tension of the liquid.
525)	Which one of the following has the lowest boiling point? a. F_2 b. I_2 c. Br_2 d. Cl_2	A	F_2 has the lowest boiling point among the halogens. It is due to its weak dipole-induced-dipole forces as F_2 has less number of electrons and has smaller size among the halogens. All these factors contribute to the least strength of Vander Waal's forces of F_2 makes its boiling point lower among halogens.
526)	Which of the following liquids has the maximum viscosity? a. Water b. Acetone c. Ethyl alcohol d. Glycerin	D	Glycerin is more viscous because of extensive possibility of h-bonding in its molecules.
527)	The reciprocal of viscosity is called: a. Surface tension b. Frictional resistance c. Fluidity d. None of these	C	Fluidity is the reciprocal of viscosity. Viscosity is the opposition to flow while fluidity is a measure of ease of flow.
528)	The S.I unit for viscosity is: a. Poise b. $\text{Kgm}^{-1}\text{s}^{-1}$	B	Co-efficient of viscosity $\eta = \frac{\text{Fr}}{\text{Av}}$

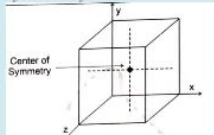


	c. $\text{Gcm}^{-1}\text{s}^{-1}$ d. Centi poise		<i>Writing units</i> $\eta = \frac{\text{nm}}{\text{m}^2 \times \frac{\text{m}}{\text{s}}} = \frac{\text{kg} \frac{\text{m}}{\text{s}} \times \text{m}}{\text{m}^3}$ $\eta = \text{kg m}^{-1} \text{s}^{-1} \text{ unit of viscosity} = \text{kg m}^{-1} \text{s}^{-1}$
529)	One poise is equal to a. $10^{-1} \text{kgm}^{-1} \text{s}^{-1}$ b. $10^{-2} \text{kgm}^{-1} \text{s}^{-1}$ c. $10^{-1} \text{kgm}^{-1} \text{s}^{-2}$ d. $10^{-1} \text{kgm}^{-2} \text{s}^{-2}$	A	<i>1 poise = $10^{-1} \text{kg m}^{-1} \text{s}^{-1}$ it is the unit of viscosity in CGS system.</i>
530)	The instrument used for the measurement of viscosity is called: a. Ostwald viscometer b. Stalagmometer c. Manometer d. Barometer	A	<i>Ostwald viscometer is used to measure viscosity of a liquid. Ostwald viscometer named after the German chemist Wilhelm Ostwald (1853-1932).</i>
531)	The viscosity of water at 25°C is: a. 1 c.p b. 2p c. 200 cp d. 2mp	A	<i>1 centipoise is the viscosity of water at 25°C.</i>
532)	The anomalous behavior of water is due to a. Directional H-bond b. Vander Waal's forces c. Dipole-dipole forces d. None	A	<i>The anomalous behavior of water is due to strong intermolecular directional forces called hydrogen bonding.</i>
533)	Ice floats on water because a. H-bonding in ice is stronger than in liquid water b. Ice has 2-dimentional structure c. Empty spaces are left in ice d. None of the above	C	<i>Ice floats on water surface due to its less density as compared to liquid water. This low density of ice is due to the empty spaces in the crystal structure of the ice. These empty spaces are there due to extensive direction hydrogen bonding which makes hexagonal structure.</i>
534)	The three dimensional arrangemet of the particles in a solid is called: a. Lattice b. Rigidity c. Symmetry d. Anisotropy	A	<i>Three-dimensional arrangement of the particle in a solid is called lattice. The three-dimensional arrangemet is a basic property of crystalline solids. Due to this property they have a definite shape.</i>



535)	Cleavage readily occurs along planes in crystals of ionic solids because the ion in the crystals are a. Arranged in a regular fashion b. Strongly bonded together c. Weakly bonded together d. Separated by a large distance	A	Because the ions are arranged in a regular fashion. That is why cleavage occurs along the planes of crystal of ionic solid.
536)	A class of materials with highly variable mechanical and optical properties that solidify from the molten state without crystallization are called a. True solids b. Amorphous solids c. Crystalline solids d. All of them	B	Amorphous solids are solidified from molten state without crystallization. It have variable mechanical and optical properties.
537)	Plastics are amorphous solids and: a. Have sharp melting point b. Undergo clean cleavage when cut with knife c. Do not undergo cleavage d. Posses orderly arrangement of particles	C	Cleavage is an anisotropic behavior and is the property of crystalline solid. Plastic is amorphous solid and are isotropic.
538)	Which onwe of the following is a pseudo solids? a. Sucrose b. Urea c. Ice d. Glass	D	Glass is called pseudo solid because it is actually referred as super cooled liquid because of its ability to flow when heated. Amorphous solid are considered to be pseudo solids.
539)	The total number of elements of symmetry in cubic unit cell? a. 33 b. 9 c. 1 d. 5	A	A cubic crystal possesses 23 elements of symmetry Plane of symmetry = $(3 + 6) = 9$ Axes of symmetry = $(3 + 4 + 6) = 13$ Center of symmetry = 1 Total symmetry = 23
540)	How many planes of symmetry are present in cubic crystals? a. 13 b. 9 c. 1 d. 5	B	Plane of symmetry means an imaginary plane which passes through the crystal and divides it into equal portion which are exactly super impossible mirror images. ➤ Three planes passess parallel to the faces of the cube Six planes passes diagonally from one



			<i>edge to the opposite edge. Plane of symmetry = $(3+6) = 9$</i>
541)	The elements of symmetry are: a. Plane of symmetry b. Axis of symmetry c. Centre of symmetry d. All of these	D	<i>There are three elements associated with the symmetry of a crystal lattice. These are plane of symmetry, axis of symmetry and center of symmetry.</i>
542)	How many centre of symmetry are present in a crystal? a. 1 b. 2 c. 3 d. 4	A	<i>A imaginary point in the center of a crystal which is equidistant from all the points of its surfaces is called center of symmetry. A crystal can have only one center of symmetry</i> 
543)	In the graphite lattice what is the number of nearest neighbours of each carbon atom? a. 3 b. 4 c. 5 d. 6	A	<i>Graphite has hexagonal layered structure. Carbon in each hexagon has 3 nearest neighbour's carbon.</i>
544)	Which one is anisotropic behavior? a. Refractive index b. Electrical and thermal conductivity c. Cleavage d. All of them	D	<i>All these properties depend on direction, its magnitude will be different in different directions that's why they all are anisotropic.</i>
545)	A small building block which has all the information about the crystal is called: a. Lattice b. Unit cell c. Space lattice d. Solid	B	<i>It is the smallest and structural unit of a crystal lattice. The entire crystal lattice can be constituted by repeating it in three dimensions.</i>
546)	How many crystallographic elements are present in unit cell? a. 5 b. 6	B	<i>There are 6 crystallographic elements or unit cell parameters. (1) The lengths of cell edges (a,b,c) The angle between them (a, b, γ)</i>



	c. 7 d. 8		
547)	Potassium crystallises in a BCC structure, the coordination number of potassium in potassium metal is: a. 2 b. 4 c. 6 d. 8	D	<i>In body centered cubic system one body center atoms is surrounded by 8 atoms present at 8 corners. So, the co-ordination number is 8</i>
548)	The number of atoms per unit cell in a simple cubic, fcc and bcc are a. 1,2,4 b. 1,4,2 c. 4,2,1 d. 2,4,1	B	<i>In simple cubic: there is one atom at each corner which is shared between 8 cubes so $8 \text{ corners} \times 1/8 = 1 \text{ atom}$ Body center atom (BCC) = 1 Total = 2 atom FCC: $8 \text{ corners} \times 1/8 = 1 \text{ atom}$ One atom at each face which is shared between two faces $6 \text{ faces} \times 1/2 = 3 \text{ atoms}$ Total atom = $3 + 1 = 4 \text{ atm}$</i>
549)	The coordination number of each ion in NaCl is: a. 4 b. 6 c. 8 d. 10	B	<i>In NaCl each Na^+ ion is surrounded by six chloride ions and each chloride ion is surrounded by six Na^+ ions that is why NaCl has a co-ordination number 6.</i>
550)	Which one is non-directional crystal? a. Ionic crystal b. Covalent crystal c. Carborundum d. Graphite	A	<i>Ionic crystals are non-directional while graphite and carbordundum are covalent crystals which have directional nature. These crystals have covalent bonds which are formed as a result of overlapping of atomic orbitals in a specific direction.</i>
551)	Which one is non directional crystal? a. NaCl b. CaCO_3 c. KMnO_4 d. All of these	D	<i>All these given crystals are not covalent crystals. That is why they are non-directional crystals. Only the covalent crystals have the directional nature.</i>
552)	LiF is an example of: a. Molecular crystal b. Covalent crystal c. Ionic crystal d. Metallic crystal	C	<i>LiF is an ionic crystal because in LiF an ionic bond is formed between lithium and fluorine.</i>



553)	SiO ₂ is an example of: a. Metallic crystal b. Covalent crystal c. Ionic crystal d. A crystal whose crystal structure depends upon temperature	B	SiO ₂ is an example of covalent crystal. It is because of the covalent bond between silicon atom and oxygen atoms formed as a result of sharing of electrons between the two atoms forming a giant structure.
554)	Silicon crystal is an example of: a. Ionic crystal b. Covalent crystal c. Metallic crystal d. Molecular crystal	B	Silicon crystallizes in a giant covalent structure at standard conditions.
555)	Carbon atom in diamond is: a. Sp hybridized b. Sp ² hybridized c. Sp ³ hybridized d. Dsp ² hybridized	C	Steric number for carbon = NO. of atoms bonded to carbon + number of lone pairs of electrons = 4 So 4 + 0 = 4, the hybridization of C in diamond is sp ³ .
556)	In close packing each sphere in its own layer are touching how many neighbor spheres? a. 4 b. 12 c. 10 d. 6	D	In close packing each atom/ion in its own layer touching 6 neighbor's atoms/ions while in open packing each atom/ion in its own layer touching four neighbor atoms/ions.
557)	Which type of packing occurs in ZnS crystal? a. CCP b. HCP c. Open packing d. None	A	ZnS is cubic close packed crystal having coordination number 12. In ZnS the layers are arranged in such a way that no sphere in the third layer lies over one in the first layer.
558)	Which type of crystal is stable if it has the following type of packing of atoms. a. CCP/HCP b. Open packing c. Both a and b d. Both a and b	D	Closed packing is more stable; it imparts more stability to crystal. HCP and CCP are close packing; thus crystal having HCP and CCP packing are stable.
559)	Ionic solids are characterized by (a) low melting points (b) good conductivity in solid state (c) high vapor pressure	(d)	The cations and anions of ionic solids are surrounded by polar solvents molecules.



(d) solubility in polar solvents

560)	Amorphous solid (a) have sharp melting points (b) undergo clean cleavage when cut with knife (c) have perfect arrangement of atoms (d) can possess small regions of orderly arrangements atoms	(d)	A long range regularity does not exist in amorphous solids but they can possess small regions of orderly arrangements of atoms, which are known as crystallites.
561)	The force of attraction between the atoms of helium (a) hydrogen bonding (b) coordinate covalent bond (c) covalent bond (d) London dispersion force.	(d)	Atoms of He are non-polar. Therefore instantaneous dipole induced dipole forces (London dispersion forces) are present among the atoms of He.
562)	Which of the following is pseudosolids? (a) CaF_2 (b) Glass (c) NaCl (d) All	(b)	Amorphous solids do not have sharp melting points that is why particles of glass soften over a temperature range. And it can be molded and blown into various shapes.
563)	In liquids intermolecular forces are (a) very weak (b) very strong (c) reasonably strong (d) ion-dipole force	(c)	The intermolecular forces hold the molecules together in liquid state. E.g. in water there is hydrogen bonding, a strong intermolecular force. But these forces are not so strong as the bonds.
564)	Instantaneous dipole-induced dipole force is also called (a) Dipole force (b) London dispersion forces (c) Hydrogen bonding (d) None of the above	(b)	A German Physicist Fritz London in 1930 gave a simple explanation for these weak attractive forces between non-polar molecules.
565)	Trend of boiling points of halogens from fluorine to iodine is that it (a) decreases (b) increases (c) remains constant (d) negligible	(b)	According to Fritz London as the atomic number increases down the group the outermost electrons move away from the nuclei, the dispersion of the electronic cloud becomes more and more easy (polarizability increases down the group). Which increases attractive force and the



			boiling point.
566)	Hydrocarbons which generally have high molecular masses exist in (a) Solid form (b) liquid form (c) Vapour form (d) Gaseous form	(a)	By increasing molecular masses of the saturated hydrocarbons, the polarizability is increased due to increased chain of C-atoms. Thus longer molecules are attracted strongly therefore they change from gaseous to liquid and finally become solids.
567)	Long chain of amino acids are coiled about one another into spiral by (a) Covalent bond (b) Ionic bond (c) hydrogen bond (d) Vander Wall's forces	(c)	Hydrogen bonds formed between the N – H group of one amino acid and the >C=O group of other amino acid hold the peptide chain frame work in three dimensions. The H-bonds stabilize these patterns in the form of spirals.
568)	At equilibrium rate of evaporation and rate of condensation (a) Become very high (b) Become very low (c) Can never be equal (d) Become equal	(d)	Evaporation of a liquid and condensation of vapours back to liquid are two opposite processes. Whenever a change of state occurs the system moves towards the condition of dynamic equilibrium. It is the situation when two opposing changes occur at equal rates.
569)	Molar heat of evaporation of water is (a) 140.6KJ/mol (b) 14.06KJ/mol (c) 18 KJ/mol (d) 40.6 KJ/mol	(d)	Water has higher value of heat of vaporization since water is a polar molecule and there also exist H-bonding between H ₂ O molecules in liquid water.
570)	Water may boil at 120°C when external pressure is (a) 760 torr (b) 100 torr (c) 1489 torr (d) 400 torr	(c)	Boiling point of a liquid is the temperature at which vapour pressure of the liquid becomes equal to the external atmospheric pressure. Since external pressure 1489 torr is, higher than 760 torr, therefore boiling point of water rises to 120°C.
571)	The pressure in which liquid can be made to boil at low temperature is called	(a)	By lowering external pressure the liquid boils at lower temperature e.g. Glycerin boils at 210°C under



- (a) Vacuum distillation
(b) Destructive distillation
(c) Distillation
(d) Vacuum destructive distillation

external pressure of 50 torr. It is called vacuum distillation.

572)	Crystal lattice of the substances can be categorized into (a) five types (b) seven types (c) six types (d) non of these	(b)	There are seven unit cells (basic structural units).
573)	Molecular crystals are generally (a) hard (b) Soft (c) Unstable (d) Stable	(b)	The intermolecular forces are responsible for cohesion of particles in the form of a solid. There are weaker forces as compared a covalent or ionic bond in the molecular crystals. Thus these are soft crystals as compared to ionic or ovalent crystals.
574)	Which is not the property of a liquid (a) Osmotic pressure (b) Diffusion (c) Freezing point (d) Melting point	(d)	The melting point term is used only for the solids.
575)	Which is not use to measure vapour pressure (a) Barometric method (b) Smith and mensies (c) Ramasay and young method (d) Capillary rise method	(d)	This method is used to measure surface tension of the liquids.
576)	If $a = b = c$ and $x = y = z = 90^\circ$ then crystal structure is (a) Cubic (b) Tetragonal (c) Orthorhombic (d) Triclinic	(a)	All lengths equal and all angles equal to 90° for a cubic structure.
577)	Which are inter molecular forces? (a) Dipole dipole bonding (b) Hydrogen bonding	(c)	Dipole-dipole and hydrogen bonding are the intermolecular forces.



	(c) Both a and b	(d) None	
578)	When vapour pressure is equal to atmospheric pressure then it is called (a) Evaporation (b) M.P. (c) B.P. (d) freezing point	(c)	Definition of boiling point of the liquids.
579)	Dipole-dipole forces and London forces are collectively called (a) Hydrogen bonding (b) Vander Waals forces (c) Covalent bonding (d) Ionic bonding	(b)	Van der Waals first of all pointed out in 1873 that there are attractive forces between the molecules. Therefore all intermolecular forces are called Van der Waals forces.
580)	Which is the correct order of stability? (a) Hydrogen bonding > dipole-dipole > London forces (b) Dipole-dipole > London forces > hydrogen bonding (c) London forces > hydrogen bonding > dipole-dipole (d) Hydrogen bonding > London forces > dipole-dipole	(a)	Among the intermolecular forces hydrogen bonding is the strongest and London forces are weakest. Strong attractions cause stability.
581)	Ionic bond, covalent bonds and coordinate bonds are (a) Intermolecular forces (b) Intermolecular forces (c) H.B. (d) Dipole-dipole interaction	(b)	Intermolecular forces are the covalent, ionic or coordinate covalent bonds, it means these bonds are the forces within a molecule.
582)	Evaporation can happen at (a) high temp. (b) Low temp. (c) All temp. (d) None	(c)	The spontaneous conversion of liquid into vapours is evaporation, and it occurs at all temperatures, but its rate is low at lower temperature.
583)	Which does not affect vapour pressure (a) Nature of liquid (b) Intermolecular forces (c) Temp. (d) None of	(d)	Vapour pressure of different liquids is different at same temperature and vapour pressure of a liquid varies with the temperature. Ether has higher V.P. than that of water due to



	these		weak intermolecular forces.
584)	Heat of evaporation increased by (a) Ionic bonding (b) Covalent bond (c) Vander Wall's (d) H.B.	(a)	Ionic solids are difficult to evaporate. So their heat of evaporation is higher.
585)	_____ is the measure of average K.E. of molecules of liquids (a) Velocity (b) Heat (c) Temp. (d) Speed	(c)	Temperature is directly proportional to the kinetic energy of molecules.
586)	Atmospheric pressure in Murree is (a) One atm. (b) 2.921 atm. (c) 0.921 atm. (d) 1.921 atm.	(c)	Pressure of air is less than 1 atmosphere at Murree Hills.
587)	Amount of heat required to convert one mole of liquid into vapours at a given temp. is called (a) Heat of evaporation (b) latent heat of vaporization (c) Mula heat of vapuration (d) None	(b)	When temperature remains constant required for vaporization is called latent heat of vaporization.
588)	There are _____ types of solids (a) 1 (b) 2 (c) 3 (d) 4	(b)	Crystalline solids and amorphous solids are two types. Crystalline solids have regular geometric pattern. And amorphous solids have no regular arrangement of atoms, ions or molecules.
589)	Which is an amorphous solid? (a) NaCl (b) NaOH (c) Diamond (d) Rubber	(d)	Rubber is an amorphous solid having no sharp melting point and no definite geometric shape.
590)	The surface formed by the breakage of a crystal is called _____ plane (a) crystal (b) Unit (c) Cleavage (d) None	(c)	Cleavage means breaking. And breaking of crystal, along the cleavage plane gives identical smaller crystals.
591)	Which of the following has isomorphous structure	(a)	NaF is cubic in shape and it is isomorphous with MgO, as both have



- (a) NaF (b) S
(c) Sn (d) N
- cubic shape.

592)	In case of elements the polymorphism is called (a) Isomorphism (b) Allotropy (c) Isotopic form (d) None	(b) An element having more than one crystalline form is called an allotrope and the phenomenon is called allotropy.
593)	The temp. at which two crystalline forms of a solid exists in equilibrium with each other is called _____. (a) equal (b) Equilibrium (c) transition temp. (d) None	(c) At transition temperature one crystalline form of a substance changes to the other. crystalline form.
594)	The crystals in which the lattice sites are fixed by cations with metallic bonds are called (a) metallic crystals (b) Ionic crystals (c) Covalent crystals (d) None	(a) In metallic crystals the positive cations are surrounded by the pool of electron which keep the cations at fixed positions.
595)	Which is trigonal crystal (a) $\text{BaSO}_4 \cdot 4\text{H}_2\text{O}$ (b) FeSO_4 (c) NaNO_3 (d) None	(c) Trigonal crystal is called Rhombohedral e. g. NaNO_3 and KNO_3 . For this system $a = b = c$ and $\alpha = \beta = \gamma = 90^\circ$
596)	The solid particles have _____ motion (a) Vibration (b) Rotation (c) To and fro (d) All	(a) Solids when heated, the surface atoms or molecules absorb energy then start vibrating at their melting points.
597)	Which forms metallic crystals (a) Cu (b) NaCl (c) Diamond (d) None	(a) Copper is a metal. Diamond is non-metal and NaCl is a compound.
598)	_____ is the simplest form of matter (a) Liquid (b) Solid (c) Gas (d) Plasma	(c) Most of the matter around us is in solid state, which consists of pure and mixed compositions. But gaseous state is the simplest as it consists of independent particles of matter.
599)	While performing a crucial	A



experiment Mr. Chemist found that an unknown liquid having dispersion forces had less vapor pressure than that having hydrogen bonding. One of the possible reasons may be

- a. Greater molar mass of the liquids
- b. Less boiling point of the liquid
- c. Less heat of vaporization
- d. Greater rate of evaporation

600)	Boiling point of butane is greater than that of 2-Methylpropane because	B	
	a. Molar mass of butane is greater than that of 2-methylpropane		
	b. Butane is straight chain while 2-Methylpropane is branched chain compound		
	c. Molecular size is butane is greater than that of 2-methylpropane		
	d. Number of atoms in butane molecule is greater than that of 2-methylpropane		
601)	If all of the following liquids are at the same temperature, then liquid having least vapor pressure will be	D	
	a. Butane C_4H_{10}		
	b. Pentane C_5H_{12}		
	c. Hexane C_6H_{14}		
	d. Heptane C_7H_{16}		
602)	Molar heat of sublimation is equal to the	C	
	a. Difference of molar heat of vaporization and molar heat of fusion		
	b. Product of molar heat of vaporization and molar heat of fusion		
	c. Sum of molar heat of		



	vaporization and molar heat of fusion d. Ratio of molar heat of vaporization and molar heat of fusion.		
603)	All of the following statements about liquids crystals are false except a. They have no orientational or positional order b. They have positional order but no orientational order c. They have orientational and weak positional order d. They don't have any of the positional or orientational order	C	
604)	All of the following are liquid crystals except a. Soap solution b. DNA c. Cholesteryl format d. Engine oil	D	
605)	Which of the following statements is correct for the statement? 'Vapor pressure of water at 0°C is 5 mmHg pressure' a. Boiling point of water will be 5°C at 5 mmHg pressure b. Boiling external of water will be 0°C c. if external pressure is 5 mmHg then water will boil at 0°C d. boiling point of water is 100°C at 760 mmHg pressure	C	
606)	The increase in vapor pressure caused by heating a liquid is due to the a. Increase in intermolecule forces among liquid molecules b. Increase in potential energy of the molecules of the	C	



	vapors c. Increase in kinetic energy of the molecules d. Decrease in surface tension of the liquid		
607)	The energy required to increase the surface of a liquid by unit area depends on the a. Molecular size of the liquid b. Strength of the intermolecular forces c. Fact that the liquid is colored or not d. pressure above the surface of the liquid	B	
608)	Detergents reduce the surface tension of water by breaking up the hydrogen bonding. The reduction of cohesive force increases the ability of water molecules to wet a solid surface by a. cohesion b. Adhesion c. Capillary action d. Quick action	B	
609)	Which one among the following is NOT a method for the measurement of the surface tension of a liquid? a. The torsion method b. The capillary rise method c. The drop method d. Half-time method	D	
610)	Equal volumes of two different liquids A and B were taken. If the strength of the intermolecular forces in A is two times that of B and if A produces 20 drops in the stalagmometric experiment then the liquid B will produce. a. 10 drops b. 20 drops c. 30 drops d. 40 drops	D	
611)	All of the following statements are correct except a. Viscosity of alcohol is less than that of water.	D	



- b. Surface tension of glycerol is greater than that of water.
- c. In a plastic tube water is a non-wetting liquid
- d. Surface tension of ethyl alcohol is less than that of diethyl ether

612)	Graphite crystals represent	B	
	a. One dimensional growth		
	b. Two-dimensional growth		
	c. Three-dimensional growth		
	d. Variable growth.		
613)	Unit cell of sodium chloride grows in	C	
	a. One dimension		
	b. Two dimension		
	c. Three dimension		
	d. All possible dimensions		
614)	Which one among the following is not a crystal system?	C	
	a. Cubic		
	b. Orthorhombic		
	c. Tetrahedral		
	d. Hexagonal		
615)	Substance having same crystalline structure are called	A	
	a. Isomorphs		
	b. polymorphs		
	c. allotropes		
	d. amorphs		
616)	cdS is isomorphous with	C	
	a. NaNO ₃		
	b. NaCl		
	c. graphite		
	d. CaCl ₂		
617)	The crystals which are good conductors of heat and electricity due to the mobility of free electrons are	D	
	a. Covalent crystals		
	b. Ionic crystals		
	c. Molecular crystals		
	d. Metallic crystals		
618)	The crystals which are soft, non-conductor of electric current having low melting point are	B	



	a. Metallic crystal b. Molecular crystals c. Ionic crystals d. Covalent crystals	
619)	Coordination number of Na^+ in NaCl is a. 1 b. 4 c. 2 d. 6	D
620)	'X' is an imaginary plane which divides a crystal into two equal halves which are the exact mirror images of each other. The proper term for 'X' is a. Axis of rotation b. Plane of symmetry c. Center of symmetry d. Axis of inversion	B
621)	Every crystal has a. Only one centre of symmetry b. Two centers of symmetry c. Three centers of symmetry d. Variable number of centers of symmetry	A
622)	A student measured the value of the lattice energy of KCl to be 690 kJ/mol. From this experiment he concluded that a. Lattice energy of KBr is 630 kJ/mol and that of KI is 665 kJ/mol b. Lattice energy of KBr is 665 kJ/mol and that of KI is 630 kJ/mol c. Lattice energy of KBr is 765 kJ/mol and that of KI is 730 kJ/mol d. Lattice energy of KBr is 730 kJ/mol and that of KI is 765 kJ/mol	B
623)	Electrical conductivity in case of the copper crystals	D



- a. Depends on the pressure
- b. Depends on the density
- c. Is anisotropic
- d. Is isotropic

624)	The particles of solids have a. Translational motion only b. Rotational motion only c. Vibrational motion only d. All of the above	C	
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625)

CHAPTER 7

CHEMICAL EQUILIBRIUM

626)	The specie with a strongest conjugate base in aqueous solution among the following; A) HI B) HNO ₃ C) CH ₃ COOH D) HClO ₄	C	
627)	Excess of BaSO ₄ was dissolved in pure water at 25°C. If its K _{sp} = 1×10^{-10} what is the Conc: of Ba ²⁺ ions in water? (a) 10 ⁻¹⁰ (b) 10 ⁻²⁰ (c) 10 ⁻⁵ (d) 10 ⁻⁶	C	As K _{sp} value is duw to product of B and SO ₄ so concentration of Ba ⁺² is : K _{sp} = [Ba][SO ₄] = 10 ⁻¹⁴ K _{sp} = [10 ⁻⁵][10 ⁻⁵] = 10 ⁻¹⁴ Ba ⁺² = 10 ⁻⁵
628)	NH ₄ OH _(aq) ⇌ NH ₄ ⁺ _(aq) + OH ⁻ _(aq) .Consider the above ionization, Ammonium chloride is added to the system. Select the correct statement. A) The equilibrium will shift to the right B) The equilibrium will shift to the left C) The equilibrium will remain undisturbed D) The equilibrium will be attained quickly	B	The equilibrium will shift towards left because NH ₄ OH is suppressed by ammonium chloride due to common ion effect.
629)	When does a chemical reaction attain equilibrium? (a) When forward and backward reaction taking place at the same rate	A	When forward and backward reaction taking place at the same rate, the equilibrium is established.



- (b) reaction takes place
 (c) The forward and backward
 (d) There are two reactions with one faster than the other

630)	For a reversible reaction to reach on equilibrium state the reaction said to be carried out in: (a) Glass vessel (b) Iron vessel (c) Open vessel (d) closed vessel	D	For reaction to reach in equilibrium, reaction must carried out in closed vessel so no product or reactant can leave the vessel and equilibrium can be established.
631)	Forces controlling the reactions are proportional to the product of the active masses (concentration) of chemicals. The above statement is of: (a) Raoult's Law (b)Le Chatlier's principle (c) The law of conservation of energy (d)The law of mass action	D	Law of mass action states that Forces controlling the reactions are proportional to the product of the active masses (concentration) of chemicals.
632)	Select the correct equilibrium constant expression, Kc for the following reversible reaction. $\text{Ce}^{4+}_{(\text{aq})} + \text{Fe}^{2+}_{(\text{aq})} \rightleftharpoons \text{Ce}^{3+}_{(\text{aq})} + \text{Fe}^{3+}_{(\text{aq})}$ (a) $\frac{[\text{Ce}^{3+}_{(\text{aq})}][\text{Fe}^{3+}_{(\text{aq})}]^2}{[\text{Ce}^{4+}_{(\text{aq})}][\text{Fe}^{2+}_{(\text{aq})}]}$ (b) $\frac{[\text{Ce}^{3+}_{(\text{aq})}][\text{Fe}^{3+}_{(\text{aq})}]}{[\text{Ce}^{4+}_{(\text{aq})}][\text{Fe}^{2+}_{(\text{aq})}]}$ (c) $\frac{[\text{Ce}^{3+}_{(\text{aq})}]^2[\text{Fe}^{3+}_{(\text{aq})}]}{[\text{Ce}^{4+}_{(\text{aq})}][\text{Fe}^{2+}_{(\text{aq})}]}$ (d) $\frac{[\text{Ce}^{3+}_{(\text{aq})}][\text{Fe}^{3+}_{(\text{aq})}]}{[\text{Ce}^{4+}_{(\text{aq})}]^2[\text{Fe}^{2+}_{(\text{aq})}]}$	B	$K_c = \frac{\text{product}}{\text{reactant}} = \frac{[\text{Ce}^{3+}_{(\text{aq})}][\text{Fe}^{3+}_{(\text{aq})}]}{[\text{Ce}^{4+}_{(\text{aq})}][\text{Fe}^{2+}_{(\text{aq})}]}$
633)	A reaction between CO and H ₂ O is: $\text{CO}_{(\text{g})} + \text{H}_2\text{O} \rightleftharpoons \text{CO}_{2(\text{g})} + \text{H}_2$ the unit of equilibrium for this reaction is: (a) Mol/liter (b) Liter/mol (c) Dimensionless (d) Mol/cm ³	C	The reaction has not unit and dimensionless because 2 mol reactants gives 2 mol products.
634)	If Kc is small, it indicates that the equilibrium occurs	A	Kc=pro/reactant If Kc is small, it means product is



	(a) At a low product concentration (b) Only with the help of catalyst (c) At a high product concentration (d) None of these		less.
635)	Consider a chemical reaction $2\text{Cl(g)} \rightleftharpoons \text{Cl}_2\text{(g)}$ The extent of completing this reaction depends upon the magnitude of K_c and shows that the equilibrium mixture will consist almost of Cl molecules when. (a) K_c is very large (b) K_c is very small (c) K_c is neither very small nor very large (d) K_c is equal to 1	A	As mixture contains mostly molecules that I Cl_3 which is product in this case. $K_c = \text{product/reactant}$ As product is more so K_c value is very large.
636)	If K_c of a certain reaction is large it indicates that at equilibrium: (a) The reactants concentration will be high (b) the products concentration will be low (c) The products concentration will be high (d) the reactants and products concentration will be equal	C	If K_c value is large, it means products are large or in high amount. Because $K_c = \text{product/reactant}$
637)	The equilibrium constant for a reaction. $\text{N}_2\text{(g)} + \text{O}_2\text{(g)} \rightleftharpoons 2\text{NO(g)}$ is 4×10^{-4} at 2000K. In the presence of catalyst the equilibrium is attained 10 times faster. The equilibrium constant in presence of catalyst at 2000 K is. (a) 10×10^{-4} (b) 4×10^{-4} (c) 40×10^{-4} (d) 4×10^{-2}	B	
638)	Consider the reaction $3\text{H}_2\text{(g)} + \text{N}_2\text{(g)} \rightarrow 2\text{NH}_3\text{(g)}$ All of the following will lead in this reaction to the production of more	A	If we increase the pressure the reaction move in forward direction, also by removing ammonia reaction will move in forward direction. If we



	NH ₃ except (a) A decrease in the volume of the container (b) An increase in pressure by addition of hydrogen (c) Removal of NH ₃ (d) An increase in pressure by addition of nitrogen		decreases the container volume it will effect reaction rate because reactants will not react easily.
639)	H ₂ + I ₂ ⇌ 2HI this reaction is not effected by: (a) Volume (b) Pressure (c) Temperature (d) PH	B	H ₂ + I ₂ ⇌ 2HI this reaction is not effected by pressure because two moles of reactants gives two moles of products.
640)	For reaction $3O_{2(g)} \rightleftharpoons 2O_{3(g)}$ K _c = 10 ⁻⁵⁶ at 25°C one can predict (a) More O ₃ is formed (b) more reactants are consumed (c) The forward reaction progresses to a large extent (d) The backward reaction goes to near completion.	D	As value of K _c is very small, so only little products is present, it means the backward reaction in near to complete.
641)	Reactant formation in an endothermic reaction would be favoured by which of the following? (a) Increase in temperature (b) Decrease in temperature (c) No change in temperature (d) First increase and then decrease in temperature	B	If reaction is endothermic, it means that It required heat to form product and its backward direction is exothermic. Decrease in temperature will favor backward direction and will form reactants.
642)	Consider the reaction $2SO_2 + O_2 \rightarrow 2SO_3$ The yield of SO ₃ will be maximum if: (a) Both pressure & temperature are increase (b) Both pressure and temperature are decrease (c) Temperature is decreased and pressure is increased. (d) Temperature is increased and pressure is decreased	C	To get more product in this case , we should decrease the temperature because the reaction is exothermic and evolve heat. Also the increase in pressure gives more product because volume is decreased in forward direction. 3 moles reactants gives 2 moles product.
643)	The value of K (equilibrium	B	The value of K _c is different for



constant) for a reaction?

- (a) Is the same at different temperatures?
- (b) Is different, at different temperature
- (c) Is negligible at room temperature.
- (d) Can be the same at different temperatures

different temperature because it is effected by temperature.

644)	Consider the following endothermic reaction: $\text{N}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{NO}_{(g)}$ What will happen to the equilibrium if the temperature of the system is raised? (a) The equilibrium will shift in the backward (b) The equilibrium position will suffer no change (c) The equilibrium will shift to forward direction (d) All of the above	C	Formation of NO is endothermic process, so increase in temperature will favor forward direction of reaction.
645)	For the exothermic reaction, forward reaction is $\text{NO}_{(g)} \rightleftharpoons \text{N}_{2(g)} + \text{O}_{2(g)}$ (a) Is independent of temperature (b) Increases as temperature increases (c) Decreases as temperature increases (d) Varies with addition of N_2 and O_2	C	The forward reaction is exothermic so it will decrease as the temperature increases.
646)	Consider the reaction $2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$. The yield of SO_3 will be maximum if: (a) both pressure & temperature are increase (b) both pressure and temperature are decrease (c) temperature is decreased and pressure is increased (d) Temperature is increased and	C	To get more product in this case , we should decrease the temperature because the reaction is exothermic and evolve heat. Also the increase in pressure gives more product because volume is decreased in forward direction. 3 moles reactants gives 2 moles product.



	pressure is decreased		
647)	In the given Exothermic reaction $PCl_3 + Cl_2(g) \rightarrow PCl_5(g)$ an increase in yield will be favored by: (a) Decrease of temperature (b) Increase of temperature (c) Keeping temperature constant (d) None of these	A	An increase in yield will be favored by decrease in temperature because forward reaction is already exothermic.
648)	The values of ionic product K_w are 0.64×10^{-14} at $18^\circ C$, 1×10^{-14} at $25^\circ C$. From this may be derived that (a) Endothermic process (b) Exothermic process (c) Vaporization process (d) Change of H_2O into O_2 and H_2	C	
649)	Which is not correct about the manufacture of ammonia by Haber – Process? The break opening of the nitrogen triple bond ($N \equiv N$) to form N_2H_2 in first step of the reaction is taken as; (a) Very difficult step (b) Highly unstable product (c) Highly endothermic (d) None of the above	C	The break opening of the nitrogen triple bond ($N \equiv N$) to form N_2H_2 in first step of the reaction is taken as highly endothermic because it involves breaking of triple bonds.
650)	$K_p = K_c (RT)^{\Delta n}$ in the equation if $\Delta n < 0$ then: (a) $K_p = K_c$ (b) $K_p < K_c$ (c) $K_p > K_c$ (d) $K_p < 0$	B	$K_p = K_c (RT)^{\Delta n}$ in the equation if $\Delta n < 0$ then $K_p = K_c (RT)^{-\Delta n}$ $K_p = K_c / (RT)^{\Delta n}$ it means that when we divide K_c by values of $RT^{\Delta n}$ value then it equals to K_p otherwise it is higher than K_p.
651)	Which is not correct about the manufacture of ammonia by Haber – Process? The break opening of the nitrogen triple bond ($N \equiv N$) to form N_2H_2 in first step of the reaction is taken as: (a) Very difficult step (b) Highly unstable product	c	The break opening of the nitrogen triple bond ($N \equiv N$) to form N_2H_2 in first step of the reaction is taken as highly endothermic because it involves breaking of triple bonds.



- (c) Highly endothermic
(d) None of the above

652)	Choose acids that are showing leveling effect; i) HClO_4 ii) HI iii) HCl iv) HF A. I & iv B. i, ii, & iv C. iii & iv D. i, ii, & ii	D
653)	Ka values of some compound are given below, select the correct order of acidic strength: i) $\text{H}_2\text{O} \rightleftharpoons \text{H}^+ + \text{OH}^-$ $K_a = 1 \times 10^{-14}$ ii) $\text{ROH} \rightleftharpoons \text{RO}^+ + \text{OH}^-$ $K_a = 1 \times 10^{-18}$ iii) $\text{RCOOH} \rightleftharpoons \text{RCOO}^- + \text{H}^+$ $K_a = 1 \times 10^{-5}$ iv) $\text{C}_6\text{H}_5\text{OH} \rightleftharpoons \text{C}_6\text{H}_5\text{O}^- + \text{H}^+$ $K_a = 1 \times 10^{-10}$ A) $\text{ROH} > \text{H}_2\text{O} > \text{C}_6\text{H}_5\text{OH} > \text{RCOOH}$ B. $\text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{ROH} > \text{RCOOH}$ C. $\text{RCOOH} > \text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{ROH}$ D. $\text{RCOOH} > \text{ROH} > \text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O}$	C
654)	Excess of Ag_2CrO_4 was dissolved in distilled water its solubility was found to be $1.3 \times 10^{-4} \text{ mol dm}^{-3}$. What is the solubility product: A. $K_{sp} = [1.3 \times 10^{-4}]^2 [1.3 \times 10^{-4}]$ B. $K_{sp} = [2.6 \times 10^{-4}]^2 [1.3 \times 10^{-4}]$ C. $K_{sp} = [1.3 \times 10^{-8}] [1.3 \times 10^{-4}]$ D. $K_{sp} = [1.3 \times 10^{-8}] [1.3 \times 10^{-4}]$	B
655)	Aqueous solution of KBr was added to the aqueous solution of MgBr_2 . Due to common Brions equilibrium is disturbed. To reach the state of new equilibrium which reaction will occur; A) $\text{K}^+_{aq} + \text{Br}^-_{aq} \rightarrow \text{KBr}$ b) $\text{Mg}^{2+}_{aq} + 2\text{Br}^-_{aq} \rightarrow \text{MgBr}_2$ c) both are possible d) common ion effect is not applicable to this system	



656)	Which reaction do you think has highest value of K_c ? A) $H_2 + I_2 \rightarrow 2HI$ b) ester + water $\rightleftharpoons$ acid + alcohol c) $Cl + Cl \rightarrow Cl_2$ d) $C + 2H_2 \rightarrow CH_4$	A	
657)	The solubility of $Ag_2Cr_2O_7$ at $25^\circ C$ was $2.0 \times 10^{-5} M$ K_{sp} value is; A) 3.2×10^{-14} B) 4.0×10^{-10} C) 8.0×10^{-25} D) 8.0×10^{-10}	B	
658)	Choose the one that cannot be classed as buffer system: A) KH_2PO_4/H_3PO_4 B) $NaClO_4/HClO_4$ C) CH_3COOH/CH_3COONa D) NH_4OH/NH_4Cl	B	
659)	Equilibrium reactions are characterized by: a. Going to completion b. Being non-spontaneous c. The presence of both reactant and products in a definite proportion d. None of these	C	<i>At equilibrium the concentration of reactants and products remain constant so at the equilibrium reactant and products have definite proportion.</i>
660)	For the reaction $Ice \rightleftharpoons water$ at $0^\circ C$ on increasing the pressure, the equilibrium will shift: a. Forward b. Backward c. No effect d. Both a and b	A	<i>Increase on pressure shift the equilibrium in direction in which the volume is decreasing. Thus, the volume decrease in forward direction and hence more water will be formed.</i>
661)	Which one is not chemical equilibrium a. $H_2 + I_2 \rightleftharpoons 2HI$ b. $CaCO_3 \rightleftharpoons CaO + CO_2$ c. $Ice \rightleftharpoons water$ d. $N_2 + 3H_2 \rightleftharpoons 2NH_3$	C	<i>It is not a chemical equilibrium because during this equilibrium there is no chemical change, however, it is a physical equilibrium.</i>
662)	A chemical reaction $A \rightleftharpoons B$ is said to be in equilibrium when: a. Complete conversion of A to B has taken place. b. The rate of transformation of	B	<i>The rate of transformation of A to B is just equal to transformation of B to A meaning that rate of forward reaction = rate of reverse reaction.</i>



	A to B in the system is just equal to the rate of transformation of B to A c. Conversion of A to B is only 50% completed d. Only 10% conversion of A and B has taken place		
663)	Which one of the following statements is not characteristic of chemical equilibrium? a. The properties of the system become constant at equilibrium b. The equilibrium can be approached from either side c. The chemical equilibrium is static in nature d. A catalyst only accelerate the approach towards equilibrium but does not change the state of equilibrium.	C	Equilibrium is a dynamic process in which the forward and backward reaction are always continue.
664)	The active mass of 2M NaOH solution? a. 2 mol dm^{-3} b. 2 mol L^{-1} c. 1 mol L^{-1} d. Both a and b	D	Active mass means molar concentration of number of moles per dm^3 in a dilute solution. So, 2 M of NaOH has active mass 2 mole dm^{-3} or 2 mol L^{-1}
665)	The unit of active mass is: a. Mol dm^{-3} b. Mol L^{-1} c. Gram d. Both a and b	A	Active mass is defined as molar concentration or number of moles per dm^3 in a dilute solution. So, its unit is mold m^{-3} or mol L^{-1}
666)	Which of the following will change the equilibrium constant for a reaction mixture? a. Changing temperature b. Adding inert gas c. Increasing pressure by decreasing volume d. All of these	A	K_C is the thermodynamic function, it only depends on temperature.
667)	For the equilibrium system $\text{CaCO}_{3(s)} \rightleftharpoons \text{CaO}_{(s)} + \text{CO}_{2(g)}$	C	$K_c + [\text{CO}_2]$ The solid is exclude from equilibrium



- a. $K_c = \frac{[CaO][CO_2]}{[CaCO_3]}$
 b. $K_c = \frac{[CaCO_3]}{[CaO][CO_2]}$
 c. $K_c = [CO_2]$
 d. $K_c = \frac{[CaO]+[CO_2]}{[CaCO_3]}$

expression because their effective concentration stay constant throughout the reaction.

668)	K _c is independent of: a. Temperature b. Concentration c. Pressure d. Both b and c	D	K _c is a thermodynamic function which only depends on temperature.
669)	When total number of moles of reactants and products are equal, then unit of equilibrium constant (K _c) will be a. Mole/dm ³ b. Mole ² /dm ³ c. No unit d. Mole ³ /dm ³	C	As $K_c = \frac{[products]}{[reactants]} = \frac{mol/dm^3}{mol/dm^3} = 1$ So, if products and reactants have same number of moles then K _c will have no unit.
670)	For which one of the following K _p = K _c : a. H ₂ + I ₂ → 2HI b. N ₂ + 3H ₂ → 2NH ₃ c. 2SO ₂ + O ₂ → 2SO ₃ d. All of them	A	As $K_p = K_c(RT)^{\Delta n} \rightarrow (B)$ Δn is the difference in the number of moles of the products and reactants. Now for chemical equation given $\Delta n = \text{moles of HI} - (\text{moles of H}_2 + \text{moles of I}_2)$ $= 2 - (1 + 1) = 2 - 2 = 0$ When $\Delta n = 0$ $K_p = K_c(RT)^0$ $K_p = K_c$
671)	For which one of the following K _p = K _c : a. N ₂ + O ₂ → 2NO b. N ₂ + 3H ₂ → 2NH ₃ c. PCI ₃ + Cl ₂ → PCI ₅ d. 2SO ₂ + O ₂ → 2SO ₃	A	As $K_p = K_c(RT)^{\Delta n}$ $K_p = K_c$ if $\Delta n = 0$ Where Δn is the difference of products and reactant moles in of the balance chemical equation so for $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ $\Delta n = 2 - (1 + 1) = 2 - 2 = 0$ $\Delta n = 0$ So $K_p = K_c(RT)^0$ $K_p = K_c$
672)	What is the unit of K _p in the following equilibrium system: 2SO ₂ + O ₂ → 2SO ₃	B	If P _A , P _B , P _C and P _D are the partial pressures of the gaseous species then the equilibrium constant K _p may be



	a. $\frac{1}{\text{atm}^3}$ b. $\frac{1}{\text{atm}}$ c. atm d. no unit	expressed as $K_p = \frac{p_C^c}{p_A^a} \times \frac{p_D^d}{p_B^b}$ Now for $2\text{SO}_{2(g)} + \text{O}_{2(g)} = 2\text{SO}_{3(g)}$ $K_p = \frac{(\text{PSO}_2)^2}{(\text{PSO}_2)^2 (\text{O}_2)} = \frac{(\text{atm})^2}{(\text{atm})^2 (\text{atm})}$ $K_p = \frac{1}{\text{atm}}$
673)	$K_c = K_p$ when Δn is equal to: a. zero b. +1 c. -1 d. -2	A As $K_p = K_c(RT)^{\Delta n} \rightarrow (A)$ If $\Delta n = 0$ Then $\Rightarrow K_p = K_c(RT)^0$ $K_p = K_c$
674)	In which of the following values of K_c the reaction goes to completion in the forward directions? a. 10^5 b. 10^{30} c. 10^{-30} d. 1	B As $K_c = 10^3$ is very high which shows that concentration of product is very high as compared to the reactants so the reaction goes towards completion in forward reaction.
675)	In a mixture where $Q_c = K_c$ is combined, what happens? a. Nothing appears to happen, but forward and reverse reaction are continuing at the same rate b. The reaction shifts toward products c. The reaction shifts toward reactants d. Nothing happens	A When $Q_c = K_c$ There is no need for the reactant or product to go in forward direction or backward direction to attain the equilibrium as it is already in equilibrium. But only backward and forward reaction continuing at the same time, with same rate
676)	Consider a chemical reaction: $2\text{Cl} \rightleftharpoons \text{Cl}_2$ the extent of completion of this reaction depends upon the magnitude of K_c and shows that the equilibrium mixture will consist almost of chlorine molecule when: a. K_c is very large b. K_c is very small c. K_c neither very large nor very small	A When K_c is very large it means that the product (Cl_2 in this case) will be present in a greater amount in the equilibrium mixture. $K_c \propto \frac{[\text{P}]}{[\text{R}]}$



	d. K_c is equal to 1		
677)	Concentration of reactants and products at the state of equilibrium is called: a. Final concentration b. Initial concentration c. Normal concentration d. Equilibrium concentration	D	Equilibrium concentration: equilibrium concentrations are constant concentrations of reactants and products. Or the concentration at equilibrium is called the equilibrium concentration.
678)	How much reaction is completed when $K_c = 1$? a. 10% b. 25% c. 50% d. 100%	C	50% of the reaction will be completed if $K_c = 1$ As $K_c = \frac{[\text{product}]}{[\text{reactants}]}$ When $K_c = 1$ $1 = \frac{[\text{products}]}{[\text{reactants}]}$ $[\text{Reactants}] = [\text{Products}]$ For $K_c = 1$ means that 50% of the reaction will be completed and concentrations of products will become equal to concentration of reactants.
679)	Which raw material is used for the synthesis of ammonia by Haber process? a. Air b. Coal-coke/methane or higher hydrocarbon c. Water d. All of them	D	The Haber process use following raw materials (i) Air (source of nitrogen) (ii) Coal coke/methane or higher hydrocarbons (iii) Water
680)	The oxidation of SO_2 by O_2 to SO_3 is an exothermic reaction. The yield of SO_3 will become maximum if: a. Temperature is increased and pressure is kept constant b. Temperature is reduced and pressure is increased c. Temperature is reduced and pressure is decreased d. Both temperature and pressure and increased	B	As $2\text{SO}_2 + \text{O}_2 = 2\text{SO}_3$ (1) As there is decrease in volume in forward direction so by increasing pressure the yield of SO_2 will increase. (2) As the reaction is exothermic the decrease in temperature favors the forward direction thus the yield of SO_3 increases by reducing the temperature i.e. E_a is lower for exothermic reaction so low temperature is



			<i>required.</i>
681)	Which one can be used to design the best reaction conditions to give the highest possible yield of product in an economic way? a. Le Chatelier Principle b. Principles of reaction kinetics c. Both a and b d. Pauli exclusion principle	C	Both the "Le-Chatelier's principle" and "reaction kinetics" helps in determining the best possible conditions for a reaction
682)	At equilibrium state axothermic reactions are favoured to the forward direction by a. Heating b. Cooling c. Compressing d. Adding reactants	B	Exothermic reaction favors in forward direction if the temperature is decreased. By cooling, the exothermic reaction moves in forward direction.
683)	Le-Chatelier's principle is concerned with a. Catalysis b. Photolysis c. Photosynthesis d. Chemical equilibrium	D	Le-Catellier's principle is an observation about chemical equilibria of a reaction.
684)	The shift of equilibrium, caused by the addition of an electrolyte having an ion in common with the dissolved salt is called: a. Common effect b. Leavelling effect c. Resonating effect d. Stearic effect	A	Common ion effect by definition.
685)	Which one of the following is applied in purification of rock salt? a. Common ion effect b. Solubility product c. Zeeman effect d. Stark effect	A	In the purification of rock salt, common ion effect is used which reduces the solubility of rock salt while the impurities are soluble. Their solubility is not decreased. In this way rock salt is separated from their impurities.
686)	The solubility of KClO_3 salt in water is decreased by adding: a. CaCO_3 b. NaCl c. NaClO_4 d. KCl	D	The solubility of KClO_3 salt in water is decreased by adding KCl due to common ion effect. $\text{As } \text{KClO}_3 = \text{K}^+ + \text{ClO}_3^-$ $\text{KCl} \rightarrow \text{K}^+ + \text{Cl}^-$ K^+ is common ion



- 687)** A reaction is reversible because
- (a) reactants are reactive
 - (b) products are reactive
 - (c) products are stable
 - (d) reactants are stable
- 688)** Strength of an acid can be determined by
- (a) P^{K_a}
 - (b) P^{K_p}
 - (c) P^{OH}
 - (d) P^{K_w}
- 689)** Units of K_w are
- 9a) mole dm^{-3}
 - (b) mole^2
 - (c) $\text{mole}^2 \text{dm}^{-6}$
 - (d) $\text{mole}^2 \text{dm}^{-3}$
- 690)** Base buffer solution can be prepared by mixing
- (a) weak acid and its salt
 - (b) strong acid and its salt with weak base
 - (c) weak base and its salt with strong acid
 - (d) strong base and its salt with weak acid
- 691)** Buffer action can be explained by
- (a) common ion effect
 - (b) law of mass action le-
chtlier's principle
 - (c) all above
 - (d) ionization of weak acid
- 692)** The ionization constant of an acid is expressed in term of the following constant
- (a) K_w
 - (b) K_n
 - (c) K_a
 - (d) K_b
- 693)** For which system does the equilibrium constant, K_c has units of concentration
- (b) Products at the same conditions of reaction start reacting to reform the original reactants.
- (a) $P^{K_a} = -\log^{K_a}$ stronger the acid greater its K_a value lower is its P^{K_a}
- (c) $K_w = [H^+][OH^-]$. As the concentrations of H^+ and OH^- are in mole/dm^3
- (c) Buffer = $NH_4OH + NH_4Cl$ in which NH_4OH is a weak base.
- (a) Consider a buffer $CH_3COOH + CH_3COONa$.
When acid is added than H^+ ions react with CH_3COO^- ions to form CH_3COOH . If base is added it reacts with CH_3COOH to form CH_3COO^- the common ion.
- (c) K_a is called dissociation constant of acid, is the quantitative measure of the strength of the acid. Higher K_a value stronger is the acid.
- (a) When the number of moles of reactants and products are unequal, then that reaction has units for its K_o



- (a) $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ or K_p value.
 (b) $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
 (c) $\text{CO} + \text{H}_2\text{O} \rightleftharpoons \text{CO}_2 + \text{H}_2$
 (d) $2\text{HF} \rightleftharpoons \text{H}_2 + \text{F}_2$

- 694)** The pH of 10^{-3} mole dm^{-3} of an aqueous solution of H_2SO_4 is
 (a) 3.0 (b) 2.7
 (c) 2.0 (d) 1.5
- 695)** The solubility product of AgCl is 2.0×10^{-10} mole ^{2} dm^{-6} the max concentration of Ag ions in the solution is
 (a) 2.0×10^{-10} mole dm^{-3}
 (b) 1.41×10^{-5} mole dm^{-3}
 (c) 1.0×10^{-10} mole dm^{-3}
 (d) 4.0×10^{-20} mole dm^{-3}
- 696)** For $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
 (a) $K_c = K_p$ (b) $K_p = K_c RT$
 (c) $K_p = K_c (RT)^{-2}$ (d) $K_p = K_c (RT)^{-1}$
- 697)** The relation between K_c and K_p is
 (a) $K_c = K_p (RT)^{A_n}$ (b) $K_p = K_c (RT)^{A_n}$
 (c) $K_c = K_p (RT)^{A_n}$ (d) $K_p = K_c (P/N)$
- 698)** The precipitation occurs if the ionic concentration is
 (a) Less than K_{sp}
 (b) More than K_{sp}
 (c) Equal to K_{sp}
 (d) Is present an any moment
- 699)** Which of the following solution have zero pH
 (a) 1 M HCl (b) MH_2SO_4
- (b) 1 mole H_2SO_4 completely ionizes to give 2 mole H^+ ions. And 10^{-3} mole H_2SO_4 gives H^+ ions = 2×10^{-3}
 $\text{pH} = -\log 2 \times 10^{-3} = -\log 2 - \log 10^{-3}$
 $= -0.3 + 3 \log 10 = -0.3 + 3 = 2.7$
- (b) $K_{sp} = [\text{Ag}^+][\text{Cl}^-] = 2 \times 10^{-10}$ At equilibrium
 $[\text{Ag}^+] = [\text{Cl}^-]$
 Therefore $[\text{Ag}^+]^2 = 2 \times 10^{-10}$ or
 $[\text{Ag}^+] = \sqrt{2 \times 10^{-10}} = 1.41 \times 10^{-5}$
- (c) According to formula $K_p = K_c (RT)^{A_n}$ and for $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
 $A_n = \text{number of moles of products} - \text{number of moles of reactants}$
 Or $A_n = 2 - 4 = 2$
 $K_p = K_c (RT)^{-2}$
- (b) The derived relationship between K_p and K_c
- (b) For any sparingly soluble salt
 $\text{A}_x\text{B}_y \rightleftharpoons x\text{A}^{+y} + y\text{B}^{-x}$
 $K_{sp} = [\text{A}^+]^x [\text{B}^-]^y$
 If the ionic product $[\text{A}^+]^x [\text{B}^-]^y > K_{sp}$ then excess concentration of ions is precipitated
- (a) $\text{pH} = -\log[\text{H}^+]$ and HCl is completely ionized. Therefore 1 molar HCl will give 1 molar concentration of H^+



	(c) 0.1 M HNO_3 CH_3COOH	(d) 1 M	ions. Then $\text{P}^{\text{H}} = -\log[1] = -(0) = 0$
700)	For which reaction the numerical value of K_c and K_p are same (a) $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ (b) $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$ (c) $\text{H}_2 + \text{Cl}_2 \rightleftharpoons 2\text{HCl}$ (d) $\text{N}_2\text{H}_4 \rightleftharpoons 2\text{NO}_2$	(c)	$K_p = K_c(\text{RT})^{\Delta n}$ for $\text{H}_2 + \text{Cl}_2 \rightleftharpoons 2\text{HCl}$ $\Delta n = 0$ $K_p = K_c(\text{RT})^0$ Or $K_p = K_c$ as $(\text{RT})^0 = 1$
701)	The pollution having zero pH will (a) basic (b) Highly basic (c) Neutral (d) Highly acidic	(d)	Any medium having $\text{P}^{\text{H}} = 7$ is neutral and $\text{P}^{\text{H}} < 7$ is acidic medium. Therefore pollution with $\text{P}^{\text{H}} = 0$ is highly acidic.
702)	Which one of the following has highest pH (a) 0.1 M HCl (b) 1.0 M HCl (c) Gastric juice (d) Lemons	(d)	1M HCl has $\text{P}^{\text{H}} = 0.1$ and 0.1M HCl has $\text{P}^{\text{H}} = 1.1$ P^{H} of gastric juice = 2.0, while the P^{H} of lemons = 2.3
703)	The sum of pH and p^{OH} is (a) 2 (b) 7 (c) 14 (d) 11	(c)	the value of P^{H} normally varies between 0 $\rightarrow$ 14 at 25°C and P^{OH} also range 0 $\rightarrow$ 14. Any solution having lower P^{H} will have higher P^{OH} , but the sum remain 14.
704)	Law of mass action was presented by (a) Henderson (b) Lewis (c) Guldberg Wage (d) Rehenius	(c)	C.M. Guldberg and P. Waage put forward the law in 1864.
705)	The unit of K_c for reaction $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$ (a) mol dm^{-3} (b) mol dm^{-3} (c) $\text{Mol}^2 \text{dm}^{-3}$ (d) No units	(d)	When the number of molecules of reactants and products are equal, then K_c has no units.
706)	If the temperature in the synthesis of ammonia is decreased. The formation of ammonia is (a) Increased (b) Decreased (c) Not effected	(a)	It is an exothermic process. And according to Le-Chatlier's principle lowering of temperature favors exothermic reaction



(d) Side reaction takes place		
707)	If K_c is very small then the product formed is in (a) Small amount (b) Large amount (c) Normal amount (d) None	(a) $K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ when K_c is very small it means concentration of products very small.
708)	The equilibrium established between the two different phases is called (a) Homogenous equilibrium (b) Isogenous equilibrium (c) Heterogeneous equilibrium (d) None	(c) When there are two different phases in equilibrium, then it is called heterogeneous equilibrium.
709)	Rate constant for gaseous reaction is written as (a) K_p (b) K_c (c) K_a (d) K_n	(a) The concentration of gases are expressed in terms of their partial pressures
710)	If K_c is greater than unity then the reaction is going in the _____ direction (a) forward (b) Backward (c) Equilibrium (d) None	(a) $K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ when $K_c > 1$, then concentration of products being formed is greater than the concentration of reactants.
711)	If K_c equal the concentration ratio then reaction is (a) Going in forward direction (b) Going in backward direction (c) In equilibrium state (d) None	(c) The value of K_c for a reaction is constant at a constant temperature. When K_c value is equal to the concentration ratio, then reaction is in equilibrium state.
712)	A chemical equilibrium in reaction is established when (a) Concentration of the reactants and products is equal (b) Opposing reaction is happening (c) Velocities of the opposing reactions are equal	(c) A dynamic equilibrium is established when the concentration of reactants and products of a reversible reaction become constant. It means velocities and (rates) of forward and backward reactions are equal.



(d) Temperature of opposing reactions are equal		
713)	In the formation of ammonia if pressures of the system is increased then the reaction _____ direction (a) Moves in forward (b) Moves in backward (c) Remains in equilibrium (d) None	(a) In the formation of NH_3 there is decrease in volume toward NH_3 . According to Le-Chatlier's principle increase in pressure will shift the reaction towards decrease in volume. i.e. in forward direction.
714)	In $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$ the yield of product will be maximum if (a) T is increased and P remains same (b) T is decreased and P is increased (c) Both T and P are increased (d) Both T and P are decreased	(b) The reaction is exothermic and there is decrease in number of moles (volume) towards the products. Therefore according to Le-Chatlier's principle lowering of temperature and rise in pressure will favour the reaction in the forward direction.
715)	The direction of the reaction is predicted (a) Law of mas action (b) Kc (c) Le-Chatlier principle (d) Hess's law	(b) The concentration ratio of products to the reactants is compared with Kc of the reaction. If Kc is greater than this ratio, the reaction moves in the forward direction but reaction moves backward when Kc is smaller.
716)	If a system at equilibrium is disturbed the system will try to undo the effect, this is called (a) Le-Chatlier's principle (b) Law of mass action (c) Hess's law (d) Law of heat of formation	(a) It is statement of this principle.
717)	In reaction $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ if the concentration of A and b is doubled then the reaction rate will (a) Increases 4 times (b) Increases 2 times (c) Decrease to half time (d) Will decrease 2 times	(a) $\text{Rate} = k[\text{A}] [\text{B}]$ by doubling the concentration A rate double and similarly for B.
718)	The le-Chatliers' principle	(a) Newton's first law = "An object will



	corresponds with the Newton's law (a) first (b) second (c) third (d) Gravitation	remain at rest or move along a straight line with constant speed, unless it is acted upon by a force". A reaction will remain in equilibrium unless stress is applied.
719)	According to the Le-chaltier's principle when heat is given to solid, which is in equilibrium with liquid (a) The amount of solid decreased (b) The amount of liquid decreases (c) Temperature will increase (d) Temperature will fall	(a) Melting of solid is an endothermic process, and according to Le-Chatlier's principle rise in temperature favors this process and solid changes to liquid.
720)	If we increase the pressure in decomposition of PCI_5 it will favour the reaction in (a) Forward direction (b) Backward direction (c) Equilibrium direction (d) None	(b) In decomposition of PCI_5 there is increase in number of moles (volume) in the forward direction. Therefore increase in pressure will according to Le-Chatlier's principle.
721)	If $K_c > 1$ then the reaction (a) Move in forward direction (b) Moves in backward direction (c) It is equilibrium (d) None	(a) $K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ When $K_c > 1$, then conc. Of products is greater than that of reactants. The reaction moves in forward direction to increase the concentration of products.
722)	If the concentration of the reactants is increased then the equilibrium will (a) Shift towards the forward direction (b) Shift towards the backward direction (c) Not be affected (d) None	(a) According to Le-Chatlier's principle the increase in concentration of reactants will shift the reaction in the forward direction since change in concentration will shift the equilibrium.
723)	In the formation of I ----- II the change of pressure result in	(c)



- (a) Shift towards the forward direction
- (b) Shift towards the backward direction
- (c) Equilibrium will not be affected
- (d) None

724) Which reaction will proceed in forward direction?

- (a) $K_c = 10$
- (b) $K_c = 10^0$
- (c) $K_c = 10^{-2}$
- (d) $K_c = 10^{-1}$

725) In common ion effect _____ soluble salt is precipitated out first

- (a) More
- (b) Less
- (c) Un-reactive
- (d) None

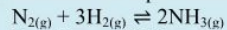
726) pH⁷ signifies

- (a) Pure water
- (b) Neutral solutions
- (c) Basic solutions
- (d) Acidic solutions

727) For gaseous equilibrium all of the following combinations are incorrect except

- a. When $\Delta n = 0$, $K_p > K_c$
- b. When $\Delta n = \text{positive}$, $K_p < K_c$
- c. When $\Delta n = \text{negative}$, $K_p < K_c$
- d. When $\Delta n = \text{negative}$, $K_p \leq K_c$

728) Consider the equilibrium

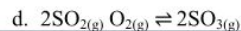


For this equilibrium

- a. $K_p < K_c$
- b. $K_p > K_c$
- c. $K_p \leq K_c$
- d. $K_p \geq K_c$

729) $K_p = K_c$ for

- a. $2\text{NOBr}_{(g)} \rightleftharpoons 2\text{NO}_{(g)} + \text{Br}_{2(g)}$
- b. $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$
- c. $\text{CO}_{(g)} + \text{H}_2\text{O}_{(g)} \rightleftharpoons \text{CO}_{2(g)} + \text{H}_{2(g)}$



730)	$K_p < K_c$ for all of the following equilibria except for a. $2\text{NO}_{(g)} + \text{Br}_{2(g)} \rightleftharpoons 2\text{NOBr}_{(g)}$ b. $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$ c. $\text{N}_{2(g)} \rightleftharpoons 2\text{NO}_{2(g)}$ d. $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{2(g)}$	c	
731)	To obtain maximum quantity of ammonia to Haber process $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$ the best option is the a. Addition of the argon gas to increase the pressure b. Reduce of the quantity of ammonia by dissolving in water c. Reduction in pressure and temperature both d. Difficult to tell from the available data	b	
732)	Addition of air will increase the yield of the product in all of the following equilibria except in a. $2\text{NO}_{(g)} \rightleftharpoons \text{N}_{2(g)} + \text{O}_{2(g)}$ b. $\text{N}_{2(g)} + 3\text{H}_{2(g)} \rightleftharpoons 2\text{NH}_{3(g)}$ c. $2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)}$ d. $2\text{H}_2\text{S}_{(g)} + 3\text{O}_{2(g)} \rightleftharpoons 2\text{H}_2\text{O}_{(g)} + 2\text{SO}_{2(g)}$	a	
733)	Consider the equilibrium $\text{N}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{NO}_{(g)}$. equilibrium constant for this reaction at room temperature is 1×10^{-30}. The value of equilibrium constant shows that a. Conditions for the reaction are not suitable b. Reactants are unstable at room temperature c. Reaction occurs to a considerable extent under the given conditions d. High pressure is required for the reaction	a	



734)	Homogeneous liquid equilibria a. Are not affected by temperature change b. May or may not be affected by pressure change c. May or may not be affected by temperature change d. Are not affected by pressure change	d	
735)	At 200°C, nitrogen oxide reacts with oxygen to form nitrogen dioxide as follows: $2\text{NO} + \text{O}_2 \rightleftharpoons 2\text{NO}_2$, $K_c = 3 \times 10^6$ In a mixture of the three species at equilibrium, we can accurately predict that: a. The concentration of both NO and O ₂ will be much larger than that of NO ₂ b. The concentration of both NO and O ₂ will be much smaller than that of NO ₂ c. The concentration of either NO or O ₂ (and possibly both) will be much smaller than that of NO ₂ . d. The concentration of O ₂ will be exactly one half of concentration of NO.	c	
736)	At 200°C, nitrogen oxide reacts with oxygen to form nitrogen dioxide as follows: $2\text{NO} + \text{O}_2 \rightleftharpoons 2\text{NO}_2$, $K_c = 3 \times 10^6$ If a mixture of these three gases contains 0.10 M NO, 0.01 M O ₂ , and 0.10 M NO ₂ then we can accurately predict that the reaction: a. Is at equilibrium b. Is not at equilibrium and must proceed from left to right to reach equilibrium c. Is not at equilibrium and must proceed from right to	b	



- left to reach equilibrium
- d. Is not at equilibrium and must proceed from right to left to reach equilibrium
- e. Is not at equilibrium but insufficient information is given to predict which direction the reaction must go to reach equilibrium.

- 737)** Consider the following reaction b
 $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
The initial concentration of N_2 , H_2 and NH_3 are
 $[\text{N}_2] = a$
 $[\text{H}_2] = b$
 $[\text{NH}_3] = 0$
When the equilibrium is reached the concentration of NH_3 is $2x$. what will be the concentration of hydrogen at equilibrium?
- $B+3x$
 - $B-3x$
 - $B-2x$
 - $B-x$

- 738)** Consider the following equilibria at room temperature b
 $2\text{Cl} \rightleftharpoons \text{Cl}_2 \quad K_C = 1 \times 10^{38}$
 $2\text{NO} \rightleftharpoons \text{N}_2 + \text{O}_2 \quad K_C = 1 \times 10^{30}$
Value of K_c for both reactions shows that
- NO is stable while Cl_2 is unstable
 - Cl_2 is stable while NO is unstable
 - Both Cl_2 and NO are stable
 - Both Cl_2 and NO are unstable

- 739)** Consider the following reactions. b
- $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$
 - $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$
 - $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
 - $\text{PCl}_5 \rightleftharpoons \text{PCl} + \text{Cl}_2$



Which of these reaction(s) should be favoured in forward direction by high pressure?

- a. I and III only
- b. I and II only
- c. II and IV only
- d. III and IV only

740)	Dinitrogen penta oxide is a white solid, it readily decomposes to NO_2 and O_2 according to the following reaction $2\text{N}_2\text{O}_5 \rightleftharpoons 4\text{NO}_2 + \text{O}_2$ Equilibrium constant expression for this reaction is	c	
	a. $K_c = \frac{[\text{NO}_2]^4 [\text{O}_2]}{[\text{N}_2\text{O}_5]^2}$		
	b. $K_C = \frac{[\text{N}_2\text{O}_5]^2}{[\text{NO}_2]^4 [\text{O}_2]}$		
	c. $K_C = [\text{NO}_2]^4 [\text{O}_2]$		
	d. $K_c = [\text{N}_2\text{O}_5]^2$		
741)	Equilibrium constant expression can be applied to	b	
	a. An aqueous solution of sucrose		
	b. An aqueous solution of table salt		
	c. An aqueous solution of fructose		
	d. A solution of petrol in kerosene		
742)	Chapter: 8 acids, basis and salts		
743)	The specie with strongest conjugate base in the solution among the following; a) HI b) HNO_3 c) CH_3COOH d) HClO_4	D	Weak acid have strong conjugate bases and strong acid have weak conjugate basis. As CH_3COOH is weak acid its conjugate base will be strong.
744)	Choose which one of the following can not be classed as buffer solution;	B	Buffers solution is made of; Weak acid and its salt with strong base $\rightarrow$ pH less than 7 (acidic)



	a) $\text{KH}_2\text{PO}_4 / \text{H}_3\text{PO}_4$ b) $\text{NaClO}_4 / \text{HClO}_4$ c) $\text{CH}_3\text{COOH} / \text{CH}_3\text{COONa}$ d) $\text{NH}_4\text{OH} / \text{NH}_4\text{Cl}$		$\text{CH}_3\text{COOH} / \text{CH}_3\text{COONa}$ Weak base and its salt with strong acid $\rightarrow$ pH more than 7 (basic) $\text{NH}_4\text{OH} / \text{NH}_4\text{Cl}$
745)	Choose acids that are showing leveling effect. i] HClO_4 ii] HI iii] HCl iv] HF a) i and iv b) i, iii and iv c) iii and iv d) i, ii and iii		HClO_4 , HI and HCl shows leveling effect because these are strong acid, HF weak acid so it does not show leveling effect.
746)	Ka values of some compounds are given below, select the correct order of acidic strength i] $\text{H}_2\text{O} \rightleftharpoons \text{H}^+ + \text{OH}^-$ $K_a = 1 \times 10^{-14}$ ii] $\text{ROH} \rightleftharpoons \text{H}^+ + \text{RO}^-$ $K_a = 1 \times 10^{-18}$ iii] $\text{RCOOH} \rightleftharpoons \text{H}^+ + \text{RCOO}^-$ $K_a = 1 \times 10^{-5}$ iv] $\text{C}_6\text{H}_5\text{OH} \rightleftharpoons \text{H}^+ + \text{C}_6\text{H}_5\text{O}^-$ $K_a = 1 \times 10^{-10}$ a) $\text{ROH} > \text{H}_2\text{O} > \text{C}_6\text{H}_5\text{OH} > \text{RCOOH}$ b) $\text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{ROH} > \text{RCOOH}$ c) $\text{RCOOH} > \text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{ROH}$ d) $\text{RCOOH} > \text{ROH} > \text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O}$	C	The stronger the acid, the larger will be K_a . As $10^{-5} > 10^{-10} > 10^{-14} > 10^{-18}$ so $\text{RCOOH} > \text{C}_6\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{ROH}$
747)	Which of the following ions can act both as bronsted acid and base in solvent water? A) CN^- B) SO_4^{2-} C) CHO_3^- D) PO_4^{3-}	C	Bronsted Acid is Proton donor specie & Bronsted base is proton acceptor. CHO_3^- can donate and accept electron
748)	The proton acceptor is: A) NH_3 B) BF_3 C) HCl D) H^+	A	NH_3 accepts proton and becomes NH_4^+
749)	Which one of the following acids has a strong conjugate base? A) CH_3COOH B) HCl C) HNO_3 D) H_2SO_4	A	Weak acid have strong conjugate bases and strong acid have weak conjugate basis. As CH_3COOH is weak acid its conjugate base will be strong.



750)	The pH of 0.001M aqueous solution of NaOH is: A) 6 B) 13 C) 11 D) 12	C	$OH = 0.001M = 10^{-3}$ Thus $pOH = 3$, As $pH + pOH = 14$ so $pH = 14 - 3 = 11$
751)	The aqueous solution of which one of the following compounds maintain its pH constant? A) CH_3COOH and $(NH_4)_2SO_4$ B) NH_4NO_3 and KNO_3 C) NH_4OH and NH_4Cl D) NH_4OH and $NaCl$	C	The solution which maintain pH is called buffer solution. It is prepared from weak acid & its salt with a strong base like CH_3COOH/CH_3COONa OR weak base and its salt with a strong acid e.g. NH_4OH and NH_4Cl
752)	According to the Bronsted and Lowry concept which of the following species cannot function as an acid? (a) SO_4^{2-} (b) H_3O^+ (c) HSO_4^- (d) NH_4^+	A	SO_4^{2-} has double negative charge and can't lose more electrons, so it can't be acid.
753)	Which of the following ions can act as a Bronsted acid and base in water? (a) HCO_3^- (b) CN^- (c) NO_3^- (d) PO_4^{3-}	A	
754)	Compounds which tend to donate electron pair are known as Lewis bases or nucleophile. Which one of the following is not a Lewis base? (a) CH_3-NH_2 (b) PH_3 (c) $AlCl_3$ (d) H_2O	C	$AlCl_3$ is Lewis acid which can accept electron pair so it cannot be Lewis base but it is Lewis acid.
755)	Which one of the following is electron deficient compounds: (a) NH_3 (b) PH_3 (c) PCl_3 (d) BCl_3	D	BCl_3
756)	The smaller the value of pK_a : (a) The weaker the base (b) The stronger the base (c) The stronger the acid (d) None of the above	C	The stronger the acid, the larger will be K_a value and smaller will be pK_a value. K_a and pK_a value are inversely proportional.
757)	Which one of the following acids has the highest pH value:	C	$pH \propto \frac{1}{Acidity}$, As HF is weakest acid in the options so its pH value is



(a) HCl(aq) (b) HNO₃(aq) highest.

(c) HF (aq) (d) H₂SO₄ (aq)

758)	An acid is a substance which accepts: a) An electron pair b) Proton c) An electron d) Pair of proton	A	An acid is a substance which accepts An electron pair or lose a proton.
759)	Pka values of some acids are given below: Choose the weaker acid? (a) HClO ₄ (-10) (b) HBr (-9) (c) H ₂ SO ₄ (-3) (d) HCl (-7)	C	The stronger the acid, the larger will be Ka value and smaller will be pKa value. -3 is largest value so it is weaker acid.
760)	What is the concentration $\frac{\text{moles}}{\text{litre}}$ of nitric acid solution having pH of 4? (a) 4 (b) -4 (c) 10 ⁻⁴ (d) 10 ⁻¹⁰	B	
761)	Which one has the strongest conjugate base? a. HF b. HCl c. HBr d. HI	A	HF is the weak acid its conjugate base F ⁻ will be strongest. $\text{HF} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{F}^-$ As $K_a = \frac{K_w}{K_b} \Rightarrow K_a \propto \frac{1}{K_b}$
762)	In the reaction, $\text{HCl}_{(\text{aq})} = \text{H}^+_{(\text{aq})} + \text{Cl}_{(\text{aq})}$ Cl is a base by: a. Arrhenius theory b. Bronsted-Lowery theory c. Lewis concept d. Usanovich concept	B	Cl ⁻ is a base because according to Bronsted Lowery concept Cl ⁻ can accept a proton. So it is bronsted base and it is the conjugate base of HCl
763)	What is the pOH of 0.001M HCl solution? a. 11 b. 3 c. 8 d. 6	A	$\text{pH} = -\log [\text{H}^+] \rightarrow (A)$ $\text{pH} = -\log(0.001) = -\log(10^{-3}) = -(-3)(1) = 3$ as $\text{pH} + \text{pOH} = 14$ $\text{pOH} = 14 - 3$ $\text{pOH} = 11$
764)	The relationship between K _a and K _b is given by: a. K _a · K _b = K _w b. K _a · K _b = 10 ⁻¹⁴ c. Both a and b d. None of these	C	$K_a \cdot K_b = K_w$ Also $K_a \cdot K_b = 10^{-14}$ Where K



- 765)** What is the correct relationship between pK_a and pK_b ?
 A $pK_a + pK_b = 14$
 where pK_a is the negative log of dissociation constant (K_a) of acid and (pK_b) is the negative log of dissociation constant K_b of base.
 a. $pK_a + pK_b = 14$
 b. $pK_a - pK_b = 14$
 c. $pK_a \cdot pK_b = 14$
 d. $pK_a + pK_b = 10$
- 766)** HCO_3^- is
 D HCO_3^- is amphoteric (substance which behaves as acid and as well as base) and amphiprotic (a substance which can donate and can accept proton)
 a. amphoteric
 b. amphiprotic
 c. acidic
 d. both
- 767)** Which one is acidic salt?
 D As $CuSO_4 + 2H_2O \rightarrow Cu(OH)_2 + H_2SO_4$
 Weak base, strong acid
 $NH_4Cl + H_2O \rightarrow NH_4OH + HCl$
 Weak base, strong acid
 $NH_4NO_3 + H_2O \rightarrow NH_4OH + HNO_3$
 Weak base, strong acid
 The solution will be acidic because all are strong acids.
 a. $CuSO_4$
 b. NH_4Cl
 c. NH_4NO_3
 d. All of them
- 768)** Solution of $FeSO_4$ is
 A Solution of $FeSO_4$ is acidic when $FeSO_4$ is dissolved in water the strong acid H_2SO_4 get formed forming an acidic aqueous solution
 $FeSO_4 + 2H_2O \rightarrow Fe(OH)_2 + H_2SO_4$
 Weak ase, strong acid
 a. Acidic
 b. Basic
 c. Neutral
 d. All of them
- 769)** The substance which behaves as a acid in basic solution and acts as a base in acidic solution is called
 A A substance which behave as an acid as well as base in called amphoteric substance.
 $H_2O + NH_3 \rightarrow NH_4^+ + OH^-$
 $H_2O + HCl \rightarrow H_3O^+ + Cl^-$
 a. Amphoteric substance
 b. Acidic substance
 c. Basic substance
 d. Neutral substance
- 770)** Which statement is correct about acids and bases?
 C According Bronsted lowery concept a weak acid has a strong conjugate base a weak base has a strong conjugate acid
 a. A weak acid has a strong conjugate base and vice versa
 b. A weak base has a strong conjugate acid and vice versa
 c. Both a and b
 d. None of these
- 771)** What is the nature of NH_4Cl ?
 A $NH_4Cl + H_2O \rightarrow NH_3 OH + HCl$
 Weak base, strong acid
 a. Acidic



- b. Basic
c. Neutral
d. None of these

The nature NH_4Cl is acidic because it makes acidic solution.

772)	Which one of the following is basic salt? a. CH_3COONa b. NaCl c. NH_4Cl d. KBr	A	As $\text{CH}_3\text{COONa} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{NaOH}$ Weak acid, strong base As CH_3COONa have strong base in solution so it is a basic salt.
773)	Which one is most acidic? a. $\text{pH} = 2$ b. $\text{pH} = 3$ c. $\text{pH} = 5$ d. $\text{pH} = 6$	A	$\text{pH} = -\log[\text{H}^+]$ $\text{pH} = \frac{\log}{[\text{H}^+]}$ greater the hydrogen ion concentration more the substance will be acidic and its pH will be less, as $\text{pH} \propto \frac{1}{\text{acidity}}$
774)	If pH of solution is 8 then hydrogen ion concentration is a. 10^{-8} b. 10^{-10} c. 10^{-2} d. 10^{-3}	A	As $\text{pH} = -\log[\text{H}^+]$ If $\text{pH} = 8$, so $[\text{H}^+] = 10^{-\text{pH}}$ $[\text{H}^+] = 10^{-8}$
775)	The pH of 0.01 M CH_3COOH is a. 2 b. Greater than 2 c. Less than 2 d. One	B	CH_3COOH is a weak acid. It cannot dissociate completely $\text{CH}_3\text{COOH} = \text{CH}_3\text{COO}^- + \text{H}^+$ 0.01 0.001 But CH_3COOH is a weak acid $[\text{H}^+] = 0.01$ It will dissociate to small extent and hence the $[\text{H}^+]$ concentration will be less than 0.01 its pH will not be 2 but it will be greater than 2.
776)	10^{-4} moles of HCl is dissolved/litre. Its pH is a. 4 b. -4 c. 5 d. 3	A	As HCl is a strong acid. It dissociates completely, thus $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$ Concentration of $\text{H}^+ = 10^{-4}$ moles/liter $\text{pH} = -\log[\text{H}^+] = -\log[10^{-4}] = 4$
777)	We have a solution with $\text{pH} = 0$, indicate H^+ ion concentration: a. 10^{-7} b. 10^7 c. 10^{-14}	D	As $\text{pH} = -\log[\text{H}^+]$ $[\text{H}^+] = 10^{-\text{pH}}$ $[\text{H}^+] = 10^{-0} = 10^0 = 1$ So, the hydrogen ion concentration will be equal to 1 molar.



d. 1

778)	If NH_3 gas is dissolved in water, pH of the solution a. May increase or decrease b. Increases c. Not effected d. Decreases	B	When NH_3 is dissolved in water pH of solution increases because it makes solution basic as a result the concentration of hydrogen ion decreases and thus Ph increases. As $\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4^+ + \text{OH}^-$
779)	Salt of weak base and strong acid has a pH approx. a. 8 b. 6 c. 7 d. 9	B	A salt is formed as a result of neutralization reaction so it has a pH nearly equal to a neutral solution (pH = 7), so a salt of weak base and strong acid has a pH= 6, slightly acidic.
780)	Very large K_a value means that the solution is a a. Strong acid b. Weak acid c. Weak base d. Stornq base	A	Large k_a value mean strong acid k_a is the ratio of concentrations of dissociated ions to the undissociated acid molecules in aqueous solution. As $K_a = \frac{[\text{H}_3\text{O}^+][\text{X}^-]}{\text{HX}}$
781)	Which one is the strongest Lewis base? a. Ammonia b. Aromatic amine c. Aliphatic amine d. 1- Alkyne	C	Aliphatic amines are strong Lewis bases because the alkyl group donate electrons density to the more electronegative nitrogen due to inductive effect hence increase the electron density on nitrogen and thus the lone pair on nitrogen is easily donated.
782)	What is the nature of SO_2 ? a. Lewis acid b. Lewis base c. Amphoteric d. All of them	A	SO_2 is Lewis acid As $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$ (sulfurous acid) Oxygen of water donate the electrons to sulphur forming an O – S bond. Thus H_2O act as the Lewis base and SO_2 as Lewis acid.
783)	CO_2 is a. Lewis acid b. Lewis base c. Bronsted acid d. Bronsted base	A	As $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$ oxygen of water donates electrons to CO_2 , thus it acts as Lewis acid and water is Lewis base as a result C – O bond is formed.
784)	Which one of the following is Lewis acid? a. Ag^+ b. AlCl_3	D	A Lewis acid can accept lone pair of electrons. It must be positive charge or hypovalent.



	c. H_3O^+ d. All of them		
785)	Which one is Lewis base? a. OH^- b. Cl^- c. NH_3 d. All of them	D	All the given species i.e. OH^- , Cl^- and NH_3 can donate a pair of electrons and so they are Lewis bases.
786)	Which one of the following is buffer system? a. $\text{HCl} + \text{NaCl}$ b. $\text{H}_2\text{SO}_4 + \text{FeSO}_4$ c. $\text{KOH} + \text{KBr}$ d. None of these	D	As all these systems involve a strong acid or strong base that is why they are not buffers. Buffer always consist of a weak acid and its salt having strong base a weak base with its salt having strong acid.
787)	Which phenomenon helps us to understand how wil buffer solution work? a. Ionization b. Common ion effect c. Neutralization d. Sublimation	B	Common ion effect best explains that how buffer solution work.
788)	Which principle/law gives best explanation of buffer action? a. Law of conservation of energy b. Law of constant composition c. Le=Catelier principle d. Pauli exclusion principle	C	Le-Chatelier's principle gives best explanation of buffer action. When the pH of the solution is changed by adding acid or base according to Le-Chatelier's principle it wil go in a direction to minimize that change, so due to buffer action the pH when changed can be re-adjusted and maintained.
789)	Which one of the following is not Buffer solution? a. $\text{CH}_3\text{COOH} + \text{CH}_3\text{COONa}$ b. $\text{NH}_4\text{OH} + \text{NH}_4\text{Cl}$ c. Both a and b d. $\text{HCl} + \text{NaCl}$	D	$\text{HCl} + \text{NaCl}$ is not a buffer because a buffer always consists of a weak acid and its salt or weak base and its salt with a strong base but HCl is a strong acid.
790)	Hman blood is buffered to a pH of a. 7.4 b. 8 c. 10 d. -6	A	Human blood also resists the change in its pH. It is buffered to a pH of 7.4
791)	Reaction with high activation energy as usually a. Fast	B	Reaction with high activation energy are usually slow. High activation energy is difficult to obtained by the



	b. Slow exothermic c. Reversible		reactants. Which results in a slow reaction.
792)	The true statement about catalyst a. Catalyst is specific in action b. In powdered form catalyst is more effective c. Catalyst starts the reaction d. Both a and B	D	The catalyst is specific in action in powdered form the surface area of catalyst is more exposed thus more effective.
793)	Point out the false statement from the given ones a. A catalyst does not differentiate between the forward and backward reaction b. Low activation energy is associated with fast reaction c. The activated state is highly unstable state d. A catalyst changes the equilibrium point of the reaction	D	A catalyst cannot change the equilibrium point. A catalyst brings the equilibrium earlier without changing equilibrium point.
794)	Larger the surface area of the reactant molecules: a. Lower will be the rate b. Higher will be the rate c. The rate remains unaffected d. The rate may increase or decrease	B	Since rate of reaction $\propto$ surface area that is larger the surface area higher will be the rate of reaction
795)	For the gaseous reaction $2X_{(g)} + Y_{(g)} \rightarrow Z_{(g)}$ The rate equation is $\text{Rate} = K[X]^2[Y]^0$ If the pressure in the reaction is doubled but the temperature remains constant. By what factor does the rate of the reaction increase? a. 2 b. 3 c. 4 d. 8	C	$\text{Rate} = K[X]^2[Y]^0$ If pressure is doubled then $\text{Rate} = K[2X]^2$ $\text{Rate} = 4(K[X]^2[Y]^0)$ or $\text{Rate} = 4(K[X]^2[Y]^0)$
796)	Rate of reaction depends on: a. Concentration	D	Rate of reaction depends on concentration, temperature and



	b. Temperature c. Catalyst d. All of these		<i>catalyst.</i>
797)	Used of catalyst in a reaction changes: a. Enthalpy b. Energy c. Internatl energy d. Activation energy	D	<i>Catalyst change the activation energy. By providing an alternative energy pathway that has lower activation energy.</i>
798)	Which of the following factors does not influence the rate of reaction: a. Concentration of the reactant b. Nature of the reactants c. Molecularity of reaction d. Temperature	C	<i>Molecularity does not influence the rate of reaction.</i>
799)	Raction between ferric chloride and potassium iodinde in solution. $2\text{FeCl}_{3(\text{aq})} + 6\text{KI}_{(\text{aq})} \rightarrow 2\text{FeI}_{2(\text{aq})} + 6\text{KCl}_{(\text{aq})} + \text{I}_{2(\text{aq})}$ at rate determining step: $\frac{dx}{dt} = k [\text{FeCl}_3]^1 [\text{KI}]^2$ what is the order of reaction w.r.t. the concentration of FeCl_3 ? a. 1 b. 2 c. 3 d. Zero	A	$\frac{dx}{dt} = k [\text{FeCl}_3]^1 [\text{KI}]^2$ <i>With respect of FeCl_3 the order of reaction is 1. By doubling the concentration of FeCl_3 the rate of reaction doubles.</i>
800)	Which one among the following acts both as an acid and a base? a. NO_3^{1-} b. SO_4^{2-} c. CO_3^{2-} d. HCO_3^{1-}	d	
801)	Strength of an acid and base is its ability to a. Corrode metals b. Convert non-metals into acids c. Decompose organic compounds d. Produce hydrogen and hydroxyl ions respectively	d	



802)	A weak acid has a a. Peculiar smell b. High density c. High pKa value d. Weak conjugate base	c
803)	Acetate ion CH_3COO^- is a a. Weak conjugate acid b. Strong conjugate acid c. Weak conjugate base d. Strong conjugate base	d
804)	Ionic product of water is a. 1×10^{-14} b. 1×10^{-15} c. 1×10^{-13} d. Difficult to tell without knowing the temperature	d
805)	Ionic product of water; upon dissolving an acidic salt like copper sulfate in it, a. Decreases b. Increases c. Remain unaffected d. Difficult to measure	c
806)	pH values of two solutions A and B are 3 and 5 respectively. The values of pH show that a. Solution B is 100 times more acidic than solution A b. Solution A is 10 times more acidic than solution B c. Solution A is 2 times more acidic than solution B d. Solution A is 100 times more acidic than solution B	d
807)	The pOH of 0.001M HCl solution is a. 10 b. 11 c. 12 d. 13	b
808)	The molar concentration of hydrogen ion in an aqueous solution at room temperature is 10^{-4}	b



what will be the molar concentration of the hydroxyl ions in this solution?

- a. 10^{-11}
- b. 10^{-10}
- c. 10^{-4}
- d. Since it is an acidic solution it does not contain hydroxyl ions

809) Acid dissociation constant for an acid is

- a. $\frac{[H_3O^+][A^-]}{[HA]}$
- b. $\frac{[H_3O^+][A^-]}{[HA]}$
- c. $\frac{[HA]}{[H_3O^+][A^-]}$
- d. $[HA]$

810) In what ratio should we mix solutions of sodium acetate and acetic acid to produce a buffer solution of pH=5. The pK_a value of acetic acid is 4.74.

- a. $\text{Log} \frac{[CH_3COONa]}{[CH_3COOH]} = 2.82$
- b. $\text{Log} \frac{[CH_3COONa]}{[CH_3COOH]} = 0.26$
- c. $\text{Log} \frac{[CH_3COOH]}{[CH_3COONa]} = 1.42$
- d. $\text{Log} \frac{[CH_3COONa]}{[CH_3COOH]} = 1.32$

811) Which one among the following salt solutions will turn blue litmus red?

- a. Sodium dicarbonate solution
- b. Potassium nitrate solution
- c. Copper sulfate solution
- d. Sodium acetate solution

812)

CHAPTER 9

Chemical KINETICS

813) The main difference between catalyst and enzyme is : C catalyst are inorganic which is used in chemical industry for many product



- a) enzyme are sharp in action than catalyst.
b) catalyst used in large concentration than enzymes.
c) catalyst are inorganic while enzyme are organic in nature.
d) enzyme need pH while catalyst does not need so.

manufacturing while enzyme are organic in nature and mostly present inside the human body.

814)	The minimum energy below which no reaction occur on reactant molecules: a) Average kinetic energy of the molecule. b) P.E of the molecule. c) Free energy of the molecule. d) Activation energy of the molecule.	D	Activation energy of the molecule are the minimum energy molecules below which no reaction occurs.
815)	Higher the activation energy of the reaction; a) Slow is the rate of reaction. b) Fast is the rate of reaction. c) Moderate is the rate of reaction. d) Activation energy is not related to the rate of reaction.	A	If activation energy is higher, less molecule will have enough energy to react and thus slow will be the rate of reaction.
816)	In transition state, the reactant are: a) Highly stable b) Moderate Stable c) Highly unstable d) In the Low energy State	C	Transition state is highly unstable and impossible to separate, also it has high energy than reactants and as well as products.
817)	According to transition state, the reacting molecules form some kind of hypothetical structure, that has i) lose the structure ii) the ability to rotate iii) the ability to rotate a) i and ii b) ii and iii c) i and iii d) i, ii and iii	D	Transition state has lose structure, ability to vibrate and rotate
818)	Consider the following reaction: $2\text{FeCl}_3 + 6\text{KI} \rightarrow 2\text{Fe}_2 + 6\text{KCl} + \text{I}_2$ Rate = $[\text{FeCl}_3]^1 [\text{KI}]^1$. Chose the correct molecularity and order of a reaction.	D	The order of the reaction is second. The molecularity of an elementary reaction is defined as the minimum number of molecules, atoms or ions of the reactants(s) required for the



	a)2 and 2 b)6 and 2 c)8 and 3 d)8 and 2		reaction to occur and is equal to the sum of the stoichiometric coefficients of the reactants in the chemical equation of the reaction.
819)	The rate law equation for reaction is given as $\frac{dx}{dt} = K [\text{FeCl}_3]^3 [\text{KI}]^2$ the reaction is: A) First order B) Second order C) Third order D) Pseudo first order	C	Its third order Book example
820)	The rate of reaction is defined as (a) Dc/dt (b) Dt/dc (c) $dc.dt$ (d) $(dc)^2/(dt)^2$	A	Its old book but Dc/dt is right.
821)	The rate law for the reaction $A \rightarrow C + k$ is given as: $\text{Rate} = K[A]$ the unit of K will be: (a) $\text{mole}^{-1} \text{dm}^3 \text{s}^{-1}$ (b) $\text{mole}^1 \text{dm}^{-3} \text{s}^{-1}$ (c) s^{-1} (d) $\text{mole}^{-1} \text{dm}^3$	C	$\text{Rate} = K[A] \rightarrow \text{conc/s} = K \text{ conc} \rightarrow k = 1/\text{s}$
822)	For which reaction of the unit of rate constant "K" is the same as that of the reaction rate? (a) Zero order (b) first order (c) second order (d) third order	A	Zero order, its old book MCQs
823)	The unit of 1 st order rate constant are: (a) Sec (b) Sec^{-1} (c) $\text{Mol.dm}^{-3} \text{sec}^{-1}$ (d) None of above.	B	The unit of rate is $\text{Mol.dm}^{-3} \text{sec}^{-1}$
824)	The unit of Kc or the system: $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$ is: (a) Dimension (1.0 with no unit) (b) Mole dm^3 (c) Mole dm^{-3} (d) $\text{Mole}^2 \text{dm}^3$	C	$K_c = \text{product} / \text{reactant}$ $K_c = [\text{NO}_2]^2 / [\text{N}_2\text{O}_4]$ $K_c = [\text{Mole dm}^{-3}]^2 / [\text{Mole dm}^{-3}]$ $K_c = \text{Mole dm}^{-3}$
825)	Consider the following general reaction $\text{IA} + \text{IB} \rightarrow \text{Products}$ rate of this reaction is expressed as $\text{Rate} = K[A][B]$ the correct order of reaction and molecularity is: (a) 2:2 (b) 2:3	A	The order of the reaction is second. The molecularity of an elementary reaction is defined as the minimum number of molecules, atoms or ions of the reactants(s) required for the reaction to occur and is equal to the



	(c) 3:2	(d) 3:3		sum of the stoichiometric coefficients of the reactants in the chemical equation of the reaction.
826)	A zero order reaction is one whose rate is independent of (a) Temp of the reaction (b) Concentration of the reactants (c) Concentration of the products (d) Material of the vessel in which the reaction is carried out	B	A zero order reaction is one whose rate is independent of concentration of reactant, the change in reactant does not effect rate of reaction.	
827)	For a certain chemical reaction the slope of the plot was determined and plotted against the concentration $(a - x)^2$ and a straight line was obtained. It indicates that the reaction is of (a) First order (b) Second order (c) Third order (d) Zero order	B	As straight line is obtained it means rate increase with increase in concentration and the concentration is square so its second order.	
828)	If half life of a certain chemical reaction is denoted by the relationship given bellow: $t_{1/2} = \frac{1}{Ka}$ Where a is initial concentration what will be the order of the reaction? (a) first order kinetics (b) second order kinetics (c) third order kinetics (d) fractional order kinetics	B	Old book MCQs, not important for ETEA. But remember it.	
829)	Which of the following is correct; a. Molecularity of a reaction is same as the order of reaction b. In some cases molecularity of a reaction is the same as order of reaction c. Molecularity of a reaction is more than order of reaction d. All are correct	A	Molecularity of a reaction is same as the order of reaction	
830)	is the chemical method used for the determination of reaction rate:	D	Volumetric analysis is the chemical method used for the determination of reaction rate:	



	(a) Conductometry (b) Polarimetry (c) pH metry (d) Volumetric analysis		
831)	The order of chemical reaction can be measure by: (a) Half life method (b) differential method (c) Ostwald method (d) all of these	D	The method by which order of reaction can be found is (a) Half life method (b) differential method (c) Ostwald method (d) Isolated method → isolated method is in the book.
832)	A catalyst is more effective when it is in the finely divided state because: (a) The valence electrons are easily available (b) This increases the surface area of the catalyst (c) It attains equilibrium quickly (d) All of the above	B	The catalyst used when such process that reaction occurs at surface , so finally divided state, the surface area increase and reaction occurs more fastly and quickly. This is for gas and solid reaction.
833)	Change in concentration of a reactant is plotted against time and the slope $\frac{dx}{dt}$ determined. The value of $\frac{dx}{dt}$ are plotted against $(a - x)^2$ a straight line is obtained. It may be concluded that the reaction is: A) First order b) Second order c) Third order d) Zero order	B	As straight line is obtained it means rate increase with increase in concentration and the concentration is square so its second order.
834)	The addition of a catalyst to a chemical reaction changes (a) the enthalpy (b) the entropy (c) The activation energy (d) The free energy	C	The catalyst decrease the activation energy so more molecules can react and reaction rate increases.
835)	Choose the one which is not the assumption of collision theory of reaction rate: (a) For chemical reaction to occur molecule/ particles must collides (b) For reacting molecules/	D	Collision molecular theory said that reaction to occur reactants must collide in specific orientation with specific energy, as hydrogen as diatomic molecule so it does not require specific orientation.



Particles must possess a certain minimum amount of energy, the activation of energy
(c) Every collision is not productive

(d) For hydrogen molecule formation from atoms require specific orientation

836)	Mathematical reaction between rate constant and temperature is given by a. Arrhenius equation b. Rate equation c. Rate expression d. None	A	Temperature and rate constant are related by Arrhenius equation which is given as $K = Ae^{-E_a/RT}$
837)	The rate constant for a particular reaction increase by increasing a. Concentration b. Pressur c. Etemperaure d. None	C	According to Arrhenius equation the rate constant can be increase by increasing temperature. Since the rate constant increases this implies that the rate of reaction increases with temperature.
838)	According to Arrhenius equation which one is true to temperature is increased a. E_a/RT decreases b. $-E_a/RT$ increases c. $e^{-E_a/RT}$ Increases d. all	D	As $K = Ae^{-E_a/RT}$ if temperature increases the $e^{-E_a/RT}$ and $-E_a/RT$ term increases while E_a/RT term decreases.
839)	Which statement about the effect of a catalyst on a reversible reaction is correct? a. It increases the equilibrium constant for the forward reaction b. It increases the yield of product in an equilibrium c. It increases the rate constants for both the forward reaction and the reverse reaction d. It increases the rate constant for the forward reaction but not that for the reverse reaction	C	Catalyst increase the rate of reaction in reversible reaction. It increases both the rate of forward and backward reaction.

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840)	A substance which retards the rate of reaction is called a. Inhibitor b. Activator c. Auto-catalyst d. None of these	A	A substance which retards a chemical reaction is called inhibitor. It has a function opposite to penicillin and aspirin
841)	For endothermic reaction: a. Forward activation energy – reverse action energy b. Forward activation energy < reverse activation energy c. No change d. Forward activation energy > reverse activation energy	D	When the activation energy of forward reaction is greater than reverse reaction then the process will be endothermic. The activation energy of forward reaction is high thus energy is absorbed from the surrounding to cross the energy barrier.
842)	The minimum energy necessary to permit a reaction to take place is: a. Threshold energy b. Activation energy c. Free energy d. Ke	B	The minimum energy necessary to permit a reaction to take place is called activation energy. To start a chemical reaction the reacting particles must have the activation energy.
843)	Activated complex is a substance which is a. Stable b. Unstable c. Can be isolated d. Can exist as product	B	Activated complex is a substance which is unstable. Activated complex has high potential energy due to which is the high unstable.
844)	For the gaseous reaction $2X_{(g)} + Y_{(g)} \rightarrow Z_{(g)}$ The rate equation is $\text{Rate} = K[X]^2[Y]^0$ If the pressure in the reaction is doubled but the temperature remains constant. By what factor does the rate of the reaction increases? a. 2 b. 3 c. 4 d. 8	C	$\text{Rate} = K[X]^2[Y]^0$ If pressure is doubled then $\text{Rate} = K[2X]^2$ $\text{Rate} = 4(K[X]^2)$ or $\text{Rate} = 4(K[X]^2[Y]^0)$
845)	Rate of reaction depends on: a. Concentration b. Temperature c. Catalyst	D	Rate of reaction depends on concentration, temperature and catalyst.



d. All of these

846)	Used of catalyst in a reaction changes: a. Enthalpy b. Energy c. Internatl energy d. Activation energy	D	<i>Catalyst change the activation energy. By providing an alternative energy pathway that has lower activation energy.</i>
847)	Which of the following factors does not influence the rate of reaction: a. Concentration of the reactant b. Nature of the reactants c. Molecularity of reaction d. Temperature	C	<i>Molecularity does not influence the rate of reaction.</i>
848)	The true statement about catalyst a. Catalyst is specific in action b. In powdered form catalyst is more effective c. Catalyst starts the reaction d. Both a and. B	D	<i>The catalyst is specific in action in powdered from the surface area of catalyst is more exposed thus more effective.</i>
849)	Point out the false statement from the given ones a. A catalyst does not differentiate between the forward and backward reaction b. Low activation energy is associated with fast reaction c. The activated state is highly unstable state d. A catalyst changes the equilibrium point of the reaction	D	<i>A catalyst cannot change the equilibrium point. A catalyst brings the equilibrium earlier without changing equilibrium point.</i>
850)	Larger the surface area of the reactant molecules: a. Lower will be the rate b. Higher will be thre rate c. The rate remains unaffected d. The rate may increase or decrease	B	<i>Since rate of reaction $\propto$ surface area that is larger the surface area higher will be the rate of reaction</i>
851)	A reaction is reversible because (e) reactants are reactive (f) products are reactive	(b)	<i>Products at the same conditions of reaction start reacting to reform the original reactants.</i>



(g) products are stable
(h) reactants are stable

852)	Strength of an acid can be determined by (a) P^{K_a} (b) P^{K_p} (c) P^{OH} (d) P^{K_w}	(a) $P^{K_a} = -\log^{K_a}$ stronger the acid greater its K_a value lower is its P^{K_a}
853)	Units of K_w are 9a) mole dm^{-3} dm ⁻³ (b) mole^2 (c) $\text{mole}^2 \text{dm}^{-6}$ 3 (d) $\text{mole}^2 \text{dm}^{-}$	(c) $K_w = [H^+] [OH^-]$. As the concentrations of H^+ and OH^- are in mole/dm^3
854)	Base buffer solution can be prepared by mixing (e) weak acid and its salt (f) strong acid and its salt with weak base (g) weak base and its salt with strong acid (h) strong base and its salt with weak acid	(c) Buffer = $NH_4OH + NH_4Cl$ in which NH_4OH is a weak base.
855)	Buffer action can be explained by (e) common ion effect (f) law of mass action Le-Chatlier's principle (g) all above (h) ionization of weak acid	(a) Consider a buffer $CH_3COOH + CH_3COONa$. When acid is added than H^+ ions react with CH_3COO^- ions to form CH_3COOH . If base is added it reacts with CH_3COOH to form CH_3COO^- the common ion.
856)	The ionization constant of an acid is expressed in term of the following constant (a) K_w (b) K_n (c) K_a (d) K_b	(c) K_a is called dissociation constant of acid, is the quantitative measure of the strength of the acid. Higher K_a value stronger is the acid.
857)	For which system does the equilibrium constant, K_c has units of concentration (e) $N_2 + 3H_2$ (f) $H_2 + I_2$ (g) $CO + H_2O$ $2NH_3$ $2HI$ $CO_2 + H_2$	(a) When the number of moles of reactants and products are unequal, then that reaction has units for its K_c or K_p value.



(h) 2HF		H ₂ + F ₂	
858)	The pH of 10 ⁻³ mole dm ⁻³ of an aqueous solution of H ₂ SO ₄ is (a) 3.0 (b) 2.7 (c) 2.0 (d) 1.5	(b)	1 mole H ₂ SO ₄ completely ionizes to give 2 mole H ⁺ ions. And 10 ⁻³ mole H ₂ SO ₄ gives H ⁺ ions = 2 x 10 ⁻³ P ^H = -log 2 x 10 ⁻³ = -log 2 - log 10 ⁻³ = -0.3 + 3 log 10 = -0.3 + 3 = 2.7
859)	The solubility product of AgCl is 2.0 x 10 ⁻¹⁰ mole ² dm ⁻⁶ the max concentration of Ag ions in the solution is (e) 2.0 x 10 ⁻¹⁰ mol dm ⁻³ (f) 1.41 x 10 ⁻⁵ mol dm ⁻³ (g) 1.0 x 10 ⁻¹⁰ mol dm ⁻³ (h) 4.0 x 10 ⁻²⁰ mol dm ⁻³	(b)	K _{sp} = [Ag ⁺] [Cl ⁻] = 2 x 10 ⁻¹⁰ At equilibrium [Ag ⁺] = [Cl ⁻] Therefore [Ag ⁺] ² = 2 x 10 ⁻¹⁰ or [Ag ⁺] = √2 x 10 ⁻¹⁰ = 1.41 x 10 ⁻⁵
860)	For N ₂ + 3H ₂ 2NH ₃ (a) K _c = K _p (b) K _p = K _c RT (c) K _p = K _c (RT) ⁻² (d) K _p = K _c (RT) ⁻¹	(c)	According to formula K _p = K _c (RT) ^{An} and for N ₂ + 3H ₂ 2NH ₃ An = number of moles of products - number of moles of reactants Or An = 2 - 4 = -2 K _p = K _c (RT) ⁻²
861)	The relation between K _c and K _p is (a) K _c = K _p (RT) ^{An} (b) K _p = K _c (RT) ^{An} (c) K _c = K _p (RT) ^{AN} (d) K _p = K _c (P/N)	(b)	The derived relationship between K _p and K _c
862)	The precipitation occurs if the ionic concentration is (e) Less than K _{sp} (f) More than K _{sp} (g) Equal to K _{sp} (h) Is present an any moment	(b)	For any sparingly soluble salt A _x B _y xA ⁺ y + yB ⁻ K _{sp} = [A ⁺] ^x [B ⁻] ^y If the ionic product [A ⁺] ^x [B ⁻] ^y > K _{sp} then excess concentration of ions is precipitated
863)	Which of the following solution have zero pH (a) 1 M HCl (b) MH ₂ SO ₄ (c) 0.1 M HNO ₃ (d) 1 M CH ₃ COOH	(a)	P ^H = - log[H ⁺] and HCl is completely ionized. Therefore 1 molar HCl will give 1 molar concentration of H ⁺ ions. Then P ^H = -log[1] = -(0) = 0



864)	For which reaction the numerical value of K_c and K_p are same (e) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (f) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ (g) $H_2 + Cl_2 \rightleftharpoons 2HCl$ (h) $N_2H_4 \rightleftharpoons 2NO_2$	(c) $K_p = K_c(RT)^{\Delta n}$ for $H_2 + Cl_2 \rightleftharpoons 2HCl$ $\Delta n = 0$ $K_p = K_c(RT)^0$ Or $K_p = K_c$ as $(RT)^0 = 1$
865)	The pollution having zero pH will (a) basic (b) Highly basic (c) Neutral (d) Highly acidic	(d) Any medium having $P^H = 7$ is neutral and $P^H < 7$ is acidic medium. Therefore pollution with $P^H = 0$ is highly acidic.
866)	Which one of the following has highest pH (a) 0.1 M HCl (b) 1.0 M HCl (c) Gastric juice (d) Lemons	(d) 1M HCl has $P^H = 0.1$ and 0.1M HCl has $P^H = 1.1$ P^H of gastric juice = 2.0, while the P^H of lemons = 2.3
867)	The sum of pH and p^{OH} is (a) 2 (b) 7 (c) 14 (d) 11	(c) the value of P^H normally varies between 0 --> 14 at 25°C and P^{OH} also range 0 → 14. Any solution having lower. P^H will have higher P^{OH} , but the sum remain 14.
868)	Law of mass action was presented by (e) Henderson (f) Lewis (g) Guldberg Wage (h) Rehenius	(c) C.M. Guldberg and P. Waage put forward the law in 1864.
869)	The unit of K_c for reaction $N_2 + O_2 \rightleftharpoons 2NO$ (a) mol dm^{-3} (b) mol dm^{-3} (c) $\text{Mol}^2 \text{dm}^{-3}$ (d) No units	(d) When the number of molecules of reactants and products are equal, then K_c has no units.
870)	If the temperature in the synthesis of ammonia is decreased. The formation of ammonia is (e) Increased (f) Decreased (g) Not effected (h) Side reaction takes place	(a) It is an exothermic process. And according to Le-Chatlier's principle lowering of temperature favours exothermic reaction
871)	If K_c is very small then the product	(a) $K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ when K_c is



formed is in

- (e) Small amount
- (f) Large amount
- (g) Normal amount
- (h) None

very small it means concentration of products very small.

872)	The equilibrium established between the two different phases is called (e) Homogenous equilibrium (f) Isogenous equilibrium (g) Heterogeneous equilibrium (h) None	(c)	When there are two different phases in equilibrium, then it is called heterogeneous equilibrium.
873)	Rate constant for gaseous reaction is written as (a) K_p (b) K_c (c) K_a (d) K_n	(a)	The concentration of gases are expressed in terms of their partial pressures
874)	If K_c is greater than unity then the reaction is going in the _____ direction (a) forward (b) Backward (c) Equilibrium (d) None	(a)	$K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ when $K_c > 1$, then concentration of products being formed is greater than the concentration of reactants.
875)	If K_c equal the concentration ratio then reaction is (e) Going in forward direction (f) Going in backward direction (g) In equilibrium state (h) None	(c)	The value of K_c for a reaction is constant at a constant temperature. When K_c value is equal to the concentration ratio, then reaction is in equilibrium state.
876)	A chemical equilibrium in reaction is established when (e) Concentration of the reactants and products is equal (f) Opposing reaction is happening (g) Velocities of the opposing reactions are equal (h) Temperature of opposing reactions are equal	(c)	A dynamic equilibrium is established when the concentration of reactants and products of a reversible reaction become constant. It means velocities and (rates) of forward and backward reactions are equal.



- 877) In the formation of ammonia if pressures of the system is increased then the reaction _____ direction
- (e) Moves in forward
(f) Moves in backward
(g) Remains in equilibrium
(h) None
- 878) In $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$ the yield of product will be maximum if
- (e) T is increased and P remains same
(f) T is decreased and P is increased
(g) Both T and P are increased
(h) Both T and P are decreased
- 879) The direction of the reaction is predicted
- (e) Law of mas action
(f) K_c
(g) Le-chatlier principle
(h) Hess's law
- 880) If a system at equilibrium is disturbed the system will try to undo the effect, this is called
- (e) Le-chatlier's principle
(f) Law of mass action
(g) Hess's law
(h) Law of heat of formation
- 881) In reaction $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ if the concentration of A and b is doubled then the reaction rate will
- (e) Increases 4 times
(f) Increases 2 times
(g) Decrease to half time
(h) Will decrease 2 times
- 882) The le-chatliers's principle corresponds with the _____ law
- (a) In the formation of NH_3 there is decrease in volume toward NH_3 . According to Le-Chatlier's principle increase in pressure will shift the reaction towards decrease in volume. i.e. in forward direction.
- (b) The reaction is exothermic and there is decrease in number of moles (volume) towards the products. Therefore according to Le=Chatlier's principle lowering of temperature and rise in pressure will favour the reaction in the forward direction.
- (b) The concentration ratio of products to the reactants is compared with K_c of the reaction. If K_c is greater than this ratio, the reaction moves in the forward direction but reaction moves backward when K_c is smaller.
- (a) It is statement of this principle.
- (a) $\text{Rate} = k[\text{A}] [\text{B}]$ by doubling the concentration A rate double and similarly for B.
- (a) Newton's first law = "An object will remain at rest or move along a straight line with constant speed, unless it is acted upon by a force". A



	(a) first (c) third	(b) second (d) Gravitation	reaction will remain in equilibrium unless stress is applied.
883)	According to the Le-chaltier's principle when heat is given to solid, which is in equilibrium with liquid (e) The amount of solid decreased (f) The amount of liquid decreases (g) Temperature will increase (h) Temperature will fall	(a)	Melting of solid is an endothermic process, and according to Le-Chatlier's principle rise in temperature favors this process and solid changes to liquid.
884)	If we increase the pressure in decomposition of PCl_5 it will favour the reaction in (e) Forward direction (f) Backward direction (g) Equilibrium direction (h) None	(b)	In decomposition of PCl_5 there is increase in number of moles (volume) in the forward direction. Therefore increase in pressure will according to Le-Chatlier's principle.
885)	If $K_c > 1$ then the reaction (e) Move in forward direction (f) Moves in backward direction (g) It is equilibrium (h) None	(a)	$K_c = \frac{[\text{Conc. of products}]}{[\text{Conc. of reactants}]}$ When $K_c > 1$, then conc. Of products is greater than that of reactants. The reaction moves in forward direction to increase the concentration of products.
886)	If the concentration of the reactants is increased then the equilibrium will (e) Shift towards the forward direction (f) Shift towards the backward direction (g) Not be affected (h) None	(a)	According to Le-Chatlier's principle the increase in concentration of reactants will shift the reaction in the forward direction since change in concentration will shift the equilibrium.
887)	The rate of reaction (a) Increases as the reaction proceeds (b) Decreases as the reaction proceeds	(b)	With the passage of time the concentrations of reactants decrease and rate is the change in concentration of reactants into products. As the conc. Of reactants



- (c) Remains the same as the reaction proceeds
(d) May decrease or increase as the reaction proceeds
- decrease the rate also drops.

888)	With increase of 10°C temperature the rate of reaction doubles. this increase in the rate of reaction is due to (a) Decreasing in activation energy of reaction (b) Decrease in the number of collisions between reactants molecules (c) Increase in activation energy of reactants (d) Increase in number of effective collisions	(d)	With the increase in temperature the molecules having higher energies increased. The velocities of molecules increased So the number of effective collisions increased and hence the rate is increased.
889)	The rate of reaction between two specific time intervals is called (a) Instantaneous rate (b) Average rate (c) Specific rate (d) Ordinary rate	(b)	The rate at any one instant interval is called the instantaneous rate and the rate of reaction between two specific time intervals is called the average rate of the reaction.
890)	The sum of the exponents of the conc terms in the rate equation is called (a) Rate of reaction (b) Order of reaction (c) Specific rate constant (d) Average rate	(b)	It is definition of order of the reaction.
891)	Photochemical reaction usually have order (a) One (b) Zero (c) Two (d) Three	(b)	The rate of photochemical reaction is independent of the concentration of reactants but depends upon the intensity light.
892)	When the rate of reaction is entirely independent of the conc. Of reaction reactant molecules then order of reaction is (a) Zero (b) First	(a)	The order of reaction is equal to the sum of all the exponents of the concentration of reactants. And if there are no concentration of reactants in the rate equation, then



	(c) Second (d) Third	order of reaction is zero.
893)	When reaction occurs in many steps then the slowest step is the (a) Min step (b) Enthalpy determining step (c) Mechanism determining step (d) Rate determining step	(d) In a multistep reaction the rate of reaction depends upon the slowest step because completion of this step is the completion of the reaction.
894)	Spectrophotometry is applied for rate determination when (a) Reactants or products, absorb U. V and I.R. light (b) Reaction involve ion (c) Reaction involve change in volume (d) None of above	(a) The rate of reaction can be measured by measuring the amount of radiations absorbed by reactant or product with the passage of time.
895)	Electrical conductivity method is applied for rate determination when (a) Reactants and products involve absorption of U. V. or I.R. radiation (b) Reaction involving ions (c) Reaction which involve change in refractive indices (d) Reactions which involve small volume change	(b) The conductivity of reaction mixture depends upon the rate of change of concentration of reactant ions or ions formed during the reaction.
896)	Dilatometric method is used for rate determination when (a) Reactions involving ions (b) Reactions involving change of optical activity (c) Reactions involving small volume change (d) None of above	(c) The volume change if taking place during the chemical reaction then volume change is directly proportional to the extent of reaction.
897)	Refractometric method is used when (a) Reactions involving absorption of I.R. or U.V. (b) Reactions involving change of refractive index (c) Reaction involving ions	(b) If a reactant or the product has refractive determine the rate of reaction with the passage of time.



(d) Change of optical activity

898)	Optical rotation method is used when (a) Reaction involve ions (b) Change of refractive indices (c) Reactions involving change of optical activity (d) None of the above	(c)	If a reaction involves either a reactant or the product which rotates the plane polarized light by an angle. Then its concentration is determined by a polarimeter which will show the change in angle of rotation.
899)	In the hydrolysis of $\text{CH}_3\text{COOC}_2\text{H}_5$ the acid produced is (a) Inhibitor (b) Catalyst (c) Auto catalyst (d) None of above	(d)	$\text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH}$ The acid produced is neither the catalyst, nor inhibitor.
900)	The factors which affect the rate of reaction (a) Nature of reactants (b) Surface area (c) Light (d) All of the above	(d)	All these factors affect the rate of reaction.
901)	Arrhenius equation describes the effect of (a) Temp. on rate of reaction (b) Volume on rate of reaction (c) Pressure on rate of reaction (d) All of above	(a)	Arrhenius equation explains the rate constant k changes with the temperature. The equation is $k = Ae^{-E_a/RT}$
902)	The reaction rate may be measured by (a) Physical method (b) Chemical method (c) Both a and b (d) None	(c)	The change in concentrations of reactants or products can be determined by both physical and chemical methods depending upon the type of reactants or products involved.
903)	By the use of catalysis the energy of activation is (a) Decreased (b) Increased (c) Not affected (d) None	(a)	Catalyst increases the rate of reaction by decreasing the energy of activation as it is a barrier in the rate of reaction.
904)	The addition of small amount of other substance to the catalyst in reaction is called	(c)	The presence of trace amounts of foreign substance make the catalyst ineffective. It is also called poisoning



	(a) Catalytic deactivation (b) Catalytic poisoning (c) Both a and b (d) None		of the catalyst.
905)	Catalysis may be (a) Homogeneous (b) Heterogeneous (c) Both a and b (d) none	(c)	Homogeneous catalysis: when catalyst phase and reactant phase are same. Heterogeneous catalysis: The phase of catalyst and reactant are not same.
906)	The branch of chemistry which deals with the study of rate of reaction is called (a) Thermodynamics (b) Chemistry of reversibility (c) Chemical kinetics (d) Mechanistic studies	(c)	The study of rate of reaction and the factors that affect the rates of chemical reaction is called reaction kinetics.
907)	The rate of reaction is denoted by (a) dc/dp (b) dc/dc (c) $+dc/dt$ (d) None	(d)	Dx is a small change in concentration of a product in a very small time interval dt .
908)	Decrease in concentration of reactant is denoted by (a) dc/dt (b) $-dc/dt$ (c) $+dc/dt$ (d) None	(b)	With the passage of time the concentration of reactant decreases and the change in concentration of reactant is indicated by negative sign. The difference of $C_2 - C_1$ is negative, C_2 being less than C_1 .
909)	The number of atoms molecules or ions whose conc. Determine the rate of reaction is called (a) Rate constant (b) Value of reaction (c) Order of reaction (d) None	(c)	Order of reaction is equal to sum of exponents of the concentrations and these exponents are the number of atoms ions or molecules of the reactants in rate determining step of the reaction.
910)	The rate of reaction may by (a) Zero order (b) Never zero order (c) without any order (d) None	(a)	The rate of reaction is zero order if it is entirely independent of the concentration of reactant molecules. The order may be zero or in fraction, can have a negative value, but usually it is a positive integer.
911)	For forward reaction according to	(a)	E_a is the minimum amount of energy



collision theory the molecules must have energy

- (a) Greater than E_a (b) Less than E_a
(c) Equal to E_a (d) None

in addition to the average kinetic energy of reactant, which the particles must have for effective collisions to form products.

912)	The change in the conc. Of reactant and products in unit time is called (a) Reaction rate (b) Rate constant (c) Diffusion (d) None	(a)	The rate of a reaction can be expressed in terms of rate disappearance of reactant or rate of formation of products in unit time
913)	The reaction rate is expressed in the units of (a) $\text{Mol dm}^{-3} \text{S}^{-1}$ (b) Mol dm^{-3} (c) $\text{Mol dm}^{-3} \text{N}^{-1}$ (d) $\text{Dm}^{-3} \text{S}^{-1}$	(a)	$\begin{aligned}\text{Rate of reaction} &= \frac{dx}{dt} \\ &= \frac{\text{change in conc.}}{\text{Time in seconds for that change}} \\ &= \frac{\text{moles dm}^{-3}}{\text{seconds}} = \text{moles dm}^{-3} \text{s}^{-1}\end{aligned}$
914)	An increase in conc. Is related to number of collisions _____ (a) Directly (b) Indirectly (c) No more (d) All	9a)	The frequency with which the molecules collide depends upon their concentrations. The more crowded molecules are, the more likely they are to collide and react with one another.
915)	The chemical reactions which may proceed slowly with measure-able rate are called (a) Slow reactions (b) Fast reactions (c) Moderate reaction (d) None	(c)	There are some slow reactions which are completed in years e.g. rusting of iron, fermentation of sugar etc. for such reactions rates are not measurable, but rates can be measured for moderate reactions.
916)	The actual number of atoms or molecules taking part in rate determining step is (a) Rate of reaction (b) Velocity of reaction (c) Order of reaction (d) Molecularly	(c)	The sum of the exponents of the concentration term in the rate equation is the order of reaction. These exponents are the number of atoms, ions or molecules taking part in the rate determining step.
917)	The energy of activation is usually expressed in	(d)	Usually the energy of substance expressed in Joules.



	(a) Ergs (c) Moles	(b) Calories (d) Joules
918)	The addition of catalyst to a reaction changes the (a) Enthalpy (b) Entropy (c) Nature of reactants (d) Energy of activation	(d) Catalyst increases the rate by decreasing the energy of activation
919)	Platinum is poisoned by (a) Arsenic (b) Silver (c) Argon (d) Zinc	(a) Arsenic makes platinized Arsenide which decrease the active sites of platinum to act as a catalyst.
920)	The units of rate constant of first order reaction are (a) S (b) S ⁻¹ (c) Mole S (d) None	(b) $\frac{dx}{dt} = k[A]^1$ is the rate equation for first order. The $k = \frac{\text{rate of reaction}}{[A]} = \frac{\text{Mole dm}^{-3}\text{s}^{-1}}{\text{Mole dm}^{-3}} = \text{s}^{-1}$
921)	The reaction rate can be measured by (a) Chemical method (b) Conductometric method (c) Both a and b (d) None	(c) Chemical method involves measurement of the speed of the reaction by chemical analysis for a reactant or a product. Conductivity method is one of physical method involving change in concentration of ions.
922)	The reaction may be (a) Third order (b) Fourth order (c) Both a and b (d) None	(a) The order of reaction ranges from zero to three. It may be in fraction or negative. And a reaction is not fourth order.
923)	The rate of a reaction depends upon (a) P (b) Temperature (c) Concentration (d) All	(d) All these factors affect the rate of reaction.
924)	The minimum function of a catalyst is to (a) Increase E _a (b) Decrease E _a (c) Decrease temp. (d) Decrease pressure	(b) Catalyst increases the rate of reaction by decreasing the energy of activation (E _a) of a reaction.



- 925) _____ are called biocatalysts (c) Enzymes are complex protein molecules and catalyse the organic reaction in living cells.
- (a) Organic acids
(b) Organic bases
(c) Enzymes
(d) All
- 926) $3\text{Fe} + 4\text{H}_2 \rightleftharpoons \text{Fe}_3\text{O}_4 + 4\text{H}_2$ is an example of _____ (b) In this reaction the substances are in solid and gaseous phases. Thus the reaction is heterogeneous. And since it is in reversible form, therefore it is called heterogeneous equilibrium reaction.
- (a) Homogeneous
(b) Heterogeneous
(c) isogeneous
(d) none
- 927) In the formation of I ----- II the change of pressure result in (c)
- (e) Shift towards the forward direction
(f) Shift towards the backward direction
(g) Equilibrium will not be affected
(h) None
- 928) Which reaction will proceed in forward direction?
- (e) $K_c = 10$
(f) $K_c = 10^0$
(g) $K_c = 10^{-2}$
(h) $K_c = 10^{-1}$
- 929) In common ion effect _____ soluble salt is precipitated out first
- (a) More (b) Less
(c) Un-reactive (d) None
- 930) pH^7 signifies
- (a) Pure water (b) Neutral solutions
(c) Basic solutions (d) Acidic solutions
- 931) Third order reaction among the following is b



- a. $\text{H}_2 + \text{I}_2 \rightarrow 2\text{HI}$
b. $2\text{FeCl}_{3(\text{ps})} + 6\text{KI}(\text{aq}) \rightarrow 2\text{FeI}_{2(\text{s})} + 6\text{KCl}(\text{aq}) + 3\text{I}_{2(\text{s})}$
c. $2\text{HI} \rightarrow \text{H}_2 + \text{I}_2$
d. $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

- | | | |
|------|--|---|
| 932) | Regarding chemical kinetics correct statement among the following is | d |
| | a. Order and molecularity both can be zero | |
| | b. Order cannot be zero | |
| | c. Molecularity can be zero | |
| | d. Order can be in fraction while molecularity cannot be in fraction | |
| 933) | In many reaction reactants pass through different intermediates before producing the products. These reactions consist of elementary steps. The rate at which product is produced depends on the | b |
| | a. Fastest step | |
| | b. Slowest step | |
| | c. Intermediate step | |
| | d. First step | |
| 934) | All of the following are physical methods for determination of the rate of the reaction except | b |
| | a. Conductometry | |
| | b. Volumetric analysis | |
| | c. Potentiometry | |
| | d. Infrared Spectro-photometry | |
| 935) | Keeping in mind different factors which affect the rate of a chemical reaction, the incorrect statement is. | c |
| | a. Rate of reaction increases with molar concentration | |
| | b. Rate of reaction increases with temperature | |
| | c. Rate of reaction increases with molar concentration but decreases with temperature | |
| | d. Rate of reaction increases with molar concentration and | |



temperature

936)	A catalyst undergoes no chemical change during the reaction, a. Same is true for its physical properties b. But it may melt during the reaction c. But it may sublime during the reaction d. But some of its physical properties may change	d	
937)	In a reversible reaction the catalyst reduces the time to reach equilibrium by a. Increase the rate of forward reaction b. Decreasing the rate of reverse reaction c. Increasing the rates of both forward and reverse reactions d. Increasing the rate of forward reactions and decreasing the rate of reverse reaction	c	
938)	In lead chamber process manufacture of SO_3 is catalyzed by NO. $2\text{SO}_{2(g)} + \text{O}_2 \rightarrow 2\text{SO}_{3(g)}$ This type of catalysis is called a. Homogeneous catalysis b. Heterogeneous catalysis c. Cationic catalysis d. Anionic catalysis	a	
939)	Ethyl alcohol is prepared from starch or grape juice by fermentation process which is catalyzed by a. Diastase, lipase and trypsin b. Invertase, diastase and lipase c. Zymase, diastase and lipase d. Diastase, invertase and zymase	D	
940)	"Rancidity produced in butter can be decreased by adding quinolone to the butter". This statement shows	b	



that

- a. Nothing is impossible
- b. Quinolone is an inhibitor
- c. Quinolone is a catalyst
- d. Quinolone is an activator

- 941) In specified conditions the rate of consumption of N_2O_5 in the reaction
 $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$
Is $0.5 \text{ mol N}_2\text{O}_5 \text{ L}^{-1} \text{ s}^{-1}$. The rate of formation of NO_2 is
- a. 0.5
 - b. 4
 - c. 2
 - d. 1

- 942) The reaction in which rate of the reaction is proportional to the product of concentrations of three reactants each raised to the first power is a
- a. First order reaction
 - b. Second order reaction
 - c. Third order reaction
 - d. Fractional order reaction

- 943) The reaction whose rate does not depend on the concentration of the reactants is
- a. Not possible
 - b. Zero order reaction
 - c. First order reaction
 - d. Second order reaction

- 944) The sum of the exponents of the concentration terms of the reactants involved in the rate expression is the
- a. Rate of the reaction
 - b. Molecularity of the reaction
 - c. Order of the reaction
 - d. Mechanism of the reactions

- 945) Reactants do not pass directly to the product till they acquire an extra amount of energy in addition to the average energy of the reactant



molecules in the system. This extra energy is known as

- a. Enthalpy of the reaction
- b. Activation energy
- c. Chemical energy
- d. Enthalpy of formation

946)	The sum of the exponents of the concentration terms of the reactants involved in the rate expression is the	c	
	e. Rate of the reaction		
	f. Molecularity of the reaction		
	g. Order of the reaction		
	h. Mechanism of the reactions		
947)	Reactants do not pass directly to the product till they acquire an extra amount of energy in addition to the average energy of the reactant molecules in the system. This extra energy is known as	b	
	e. Enthalpy of the reaction		
	f. Activation energy		
	g. Chemical energy		
	h. Enthalpy of formation		
948)	During a chemical reaction, rate with which a solid substance reacts	c	a.
	a. Decreases with passage of time		
	b. Increases with passage of time		
	c. Remains constant		
	d. May increase or decrease depending on the pressure		
949)	The type of catalysis in which catalyst has the same state as that of the reactants is a	a	
	b. Homogeneous catalysis		
	c. Heterogeneous catalysis		
	d. Miscellaneous catalysis		
	e. A and b are correct		
950)	Which one among the following is not a postulate of the collision theory?	c	



- a. Reactant molecules must collide to initiate a reaction
- b. Only collisions among activated molecules lead to product formation
- c. Reactant molecules must have high rotational energy to produce stable product
- d. Reactant molecules must be properly oriented for effective collision which can lead to the product formation

951)

CHAPTER 10

SOLUTION AND COLLOIDS

952) Colloidal particles can be separated by using;

- A. Ordinary filter paper
- B. Coarse filter paper
- C. Fine Filter paper
- D. Extremely fine filter paper

D

953) 10.0 dm³ gas cylinder containing mixture of various gases 50cm³ of nitrogen gas is in the mixture what is the the concentration of N₂ gas in part per billion (ppb);

- A) $\frac{50}{1000} \times 10^9$
- B) $\frac{50}{10,000} \times 10^9$
- C) $\frac{50}{100,000} \times 10^6$
- D) $\frac{50}{1000} \times 10^6$

B

954) If the force of attraction exists between the particles of dispersed phase and the dispersion medium terms, the soil is called:

- A. Lyophilic
- B. Lyophobic
- C. Hydrophilic
- D. Hydrophobic

A

955) Select completely immiscible pair of liquids:

- A. Phenol-water system
- B. Trimethylamine and water system

C



C. Carbon disulphide and water system

D. Ethanol and water system

956)	The molality of 2.0 g NaOH (Mr=40 g/mol) in 250 g distilled water at 4°C will be exactly equal to: A) 0.20 m B) 0.25 m C) 1.20 m D) 0.5 m		
957)	The melting point of a crystalline solid by the addition of impurities; A) Increases B) Decreases C) Remains the same D) 1st decreases then increase		
958)	A student dissolved 50.5g KNO ₃ (KNO ₃ = 101.0 g/mol) in 1000g distilled water and allowed to boil. The solution started boiling at; A) 100.52°C B) 100°C C) 101.04°C D) KNO ₃ is insoluble in water		
959)	Aiman in laboratory dissolve 4g of NaOH in 250ml of water. The molarity of this solution is: A) 0.4M B) 4M C) 0.2M D) 0.1M	A	We know that Molarity=moles/Litre, Now moles = mass/ molar mass mass → 4/40 = 0.1 mol and 250ml = 0.25 L So Molarity=no of moles/Litre = 0.1/0.25 = 0.4M
960)	2.3g of ethanol (C ₂ H ₅ OH) is added to 500g of water determine the molality of the resulting solution; (a) 0.01 molal (b) 0.1 molal (c) 1.1 molal (d) 1.0 molal	B	given data: mass of water = 500g or 0.5 kg, mass of ethanol = 2.3 g, we will find molar mass that is 12 x 2 + 5+16+1= 46 so we can also find no of moles that is $n = \frac{m}{M} = \frac{2.3}{46} = 0.05$. now find molality by formula Molality = $\frac{\text{no of moles}}{1 \text{ kg}} = \frac{0.05}{0.5} = 0.1 \text{ molal}$
961)	The 2% solution by weight of sodium chloride solution is prepared. The molality of this solution is: (a) .34 molal (b) 0.25 molal (c) 2 molal (d) 0.02 molal	A	2% solution means 2 gm NaCl dissolved in water so Mass of NaCl = 2g and solution is 100 g or 0.1 kg as 1 kg= 1000 g Molarity = moles/Kg and mole = n/M



			Molarity = $n/M \text{ kg} = 2/58.5 \times 0.1 = 0.34 \text{ molal}$
962)	If 20.0 cm ³ of 0.5 M solution is diluted to 1.0 dm ³ . What will be its new concentration? (a) 0.001 M (b) 0.01 M (c) 1.0 M (d) 10.0 M	A	1000 cm ³ = 1 dm ³ so 20.0 cm ³ = 0.02 dm ³ and $M = n/\text{dm}^3 \rightarrow n = M \times \text{dm}^3 = 0.5 \times 0.02 = 0.01 \text{ mole}$ now if solution is diluted to 1.0 dm ³ then $M = n/\text{dm}^3 = 0.01/1 = 0.01 \text{ mol}$
963)	To what volume in must 50.0ml of 3.50 M H ₂ SO ₄ be diluted in order to make 2 M H ₂ SO ₄ ? (a) 25 (b) 60.1 (c) 87.5 (d) 93.2	C	: given $M = 2M$ so by using $M = n/V \rightarrow V = n/M \rightarrow V = n/2$ eq 1, now we have to find n value for this equation from {50 ml or 0.05 L and 3.50 M} $M = n/V \rightarrow n = M \times V \rightarrow 3.50 \times 0.05 = 0.175 \text{ mol}$. Equation 1 becomes $V = n/2 = 0.175/2 = 0.0875 \text{ L} = 87.5 \text{ ml}$
964)	A solution of 2.0 g NaOH dissolved in 1000g of water has the following concentration. (a) 0.50m (b) 0.05M (c) 0.05N (d) 0.05m	B	$m = \frac{n}{\text{kg or } 1000g}$ here $n = \frac{\text{mass}}{\text{Molar mass}} = \frac{2}{40} = 0.05$ so $m = \frac{0.05}{1000g} = 0.05$
965)	.1000 Mole of NaCl was dissolved in 1.000 dm ³ distilled water at 298K. The concentration of resulting solution is: (a) 5.85 M (b) 1.00 M (c) 0.1000 M (d) <0.1000 M	C	given data; no of moles = 0.1000 mole and Volumes = 1.000 dm ³ . we know that $M = \frac{\text{no of moles}}{\text{1 litre or } 1\text{dm}^3} = \frac{0.1000}{1.000}$ so putting values, $\frac{0.1000}{1.000} = 0.1000M$
966)	10ml of 1.5 M NaOH solution is neutralized by 20ml of a M HCl solution. The value of a will be: (a) 1.0 (b) 0.75 (c) 0.5 (d) 0.25	B	given : $V = 10 \text{ mL}$, $M = 1.5$ by $M=n/L \rightarrow n = M \times L$ we will find n, which is $1.5 \times 10 \text{ mL}$. Now if V is 20 mL the new volume by formula $M = n/V$ is $V = n/M = \frac{1.5 \times 10\text{mL}}{20 \text{ mL}} = 1.5/2$
967)	The 2% solution by weight of sodium chloride solution is prepared. The molality of this solution is: (a) .34 molal (b) 0.25 molal (c) 2 molal (d) 0.02 molal	A	2% solution means 2 gm NaCl dissolved in water so Mass of NaCl = 2g and solution is 100 g or 0.1 kg as 1 kg = 1000 g Molarity = moles/Kg and mole = n/M Molarity = $n/M \text{ kg} = 2/58.5 \times 0.1 = 0.34 \text{ molal}$
968)	The vapour pressure of pure acetone is 347 mm Hg. A mixture of 58.0 g acetone and 2.0 g of water	d	actona formula is C ₃ H ₆ O and its molar mass is 58.08. its number of mole is $n = \text{mass} / \text{molar}$



is made. According to Raoult's law, what is the partial pressure of the acetone in this mixture?

- (a) 382 mm Hg (b) 298 mm Hg
(c) 242 mm Hg (d) 312 mm Hg

mass $\rightarrow 58/58=1$. The number of moles of water are $2/18 = 0.1111$ mole.

Now mole fraction of acetone is

$$\frac{1}{1+0.1111} = \frac{1}{1.1111} = 0.900. \text{ now by}$$

Raoult's law; $P_A = P_A^0 X_A = 347 \times 0.900 = 312 \text{ mmHg}$

- 969) Pure water freezes at 0°C and boils at 100°C at standard conditions. Calcium chloride was added to pure water. What do you expect about its freezing point and boiling point.
A) No change in its freezing point and boiling point
B) Freezing point increases and boiling point decreases.
C) Freezing point increases and boiling point increases
D) Freezing point decreases and boiling point increases
- 970) The solubility of solute depends on:
(a) Temperature of solution
(b) Quantity of solvent
(c) Quantity solute
(d) All the three choices
- 971) Salts which dissolve in water with evolution of heat. The effect of temperature on their solubility will be:
A) Increases with increase in temperature
B) Decreases with increase in temperature
C) Solubility does not change
D) In some cases it increases while in others it decreases
- 972) Which of the following ions has largest heat of hydration
(a) Ba^{+2} (b) K^{+1}
(c) Li^{+1} (d) Be^{+2}
- According to Colligative properties of solution, Elevation of Boiling Point occurs so boiling point will increase and depression of freezing point occurs so freezing point will decrease.
- solubility is moles of grams of solute dissolved in 100 gm of solvent so it depends on quantity of solute and solvent as well as it depends upon temperature and pressure.
- as heat is evolved so it is type of exothermic solution & in such cases increase in temperature decrease the solubility because it already loss heat and does not need more. Like wise for endothermic reaction solubility increase with increase in temperature.
- heat of hydration is directly proportional to charge and inversely proportional to radius, so Ba^{+2} and Be^{+2} have more heat of hydration on



			basis of charge as compared to rest of other, on basis of radius Be^{+2} have small radius to it have more heat of hydration. → heat of hydration $\propto Q/r$
973)	Water has a vapour pressure of 23.75 at 25°C what is the vapour pressure of a solution sucrose if its mole fraction is 0.25? (a) 15.2 torr (b) 17.8 torr (c) 23.8 torr (d) 29.7 torr	b	we know that $P = X_1 P^0$, here P^0 is given which is 23.75 but need X_1 which Mole fraction of solvent, We know that $X_1 + X_2 = 1$ then $X_1 = 1 - X_2 = 1 - 0.25 = 0.75$. so putting values in $P = X_1 P^0$, we get $= 0.75 \times 23.75 = 17.8$ torr,
974)	A solution contains 2 moles of sucrose's in 6 moles of water. What is the mole fraction of sucrose? (a) 0.25 (b) 0.75 (c) 0.5 (d) 3.0	a	$X_1 = X_1/X_1+X_2 = 2/2+6 = 2/8 = 0.25$
975)	A solution has three components A, B and C. the mole fraction of A and C are 0.15, 0.45 respectively the mole fraction of is; (a) 0.25 (b) 0.005 (c) 0.40 (d) 0.60	c	we now that sum of mole friction = 1 so $X_1 + X_2 + X_3 = 1 \rightarrow X_2 = 1 - 0.15 - 0.45 = 0.40$ Now check $0.15 + 0.45 + 0.40 = 1$
976)	The stability of colloidal system depends on: (a) Charge on the particle (b) Solvation (c) Brownian motion (d) All of the above	d	the charged particles attract solvent molecules which form a layer around them. Th solvation depends on the affinity of solvent towards the atoms and group of atoms forming surface of particle, while brownian motion counteracts the force of gravity on the colloidal particles and partly responsible for stability of the colloidal system.
977)	The osmotic pressure of dilute solution is given below by relationship: (a) $\pi = \frac{MRT}{C}$ (b) $\pi = \frac{RCT}{M}$ (c) $\pi = \frac{MR}{TC}$ (d) $\pi = \frac{RC}{TM}$	b	the osmotic pressure of dilute solution is given by: $\pi = \frac{RTC}{M}$
978)	A water sample contains $3.8 \times 10^3 \text{ g}$ of mercury per kilo gram of the	A	given date; water sample $= 3.8 \times 10^{-3} \text{ g} = 3.8 \times 10^{-6} \text{ kg}$ and mercury mass 1 g.



	sample. What is the concentration of mercury in parts per million? (a) 3.8 ppm (b) 38 ppm (c) 0.38 ppm(d) 380 ppm		We know that ppm $\frac{\text{wt. or vol. of solute}}{\text{wt. or vol. of solvent}} \times 10^6 = [3.8 \times 10^{-6} / 1] \times 10^6 = 3.8 \text{ ppm}$
979)	Which of the following is not true of a colloid? a. It is heterogeneous b. Scatter light c. Can pass through ultra-filter paper d. Its particles cannot be seen under ordinary microscope	A	Colloid is homogenous, it has more quality of a homogeneous mixture.
980)	Milk is an example of a. Sol b. Gel c. Emulsion d. True solution	C	An emulsion is a particular type of colloid, in milk fat particles (globules) dispersed in an aqueous environment.
981)	The process of separation of colloidal particles by ultrafilters is called: a. Filtration b. Ultrafiltration c. Titration d. Distillation	B	Ultrafiltration is the separation technique of colloidal particles by using ultra filter paper.
982)	Which one is colloid: a. Starch in water b. Blood serum c. Gum in water d. All of them	D	All of them fulfill the condition of a colloid.
983)	The solubility of sugar in water is due to a. High dielectric constant of water b. High solvation energy c. Hydrogen bonding with water d. High dipole moment of water	C	The sugar is soluble in water because it is able to form hydrogen bond with water.
984)	Which factor affects the solubility of a solute? a. Pressure b. Temperature c. Both a and b	C	Solubility is affected both by pressure and temperature.



	d. None of them		
985)	If water is used as solvent the dissolution process is called: a. Hydration b. Solvation c. Electrolysis d. Hydrogenolysis	A	The water dissolution process is called hydration and when another solvent is used it is called solvent.
986)	Which one is temperature dependent? a. Molarity b. Molality c. Mole fraction d. Both b and c	A	$\text{Molarity} = \frac{\text{Number of mole of solute}}{\text{Volume of solution}}$ volume is temperature dependent so molarity is also temperature dependent.
987)	A 1M solution of H_2SO_4 contain how much mass of H_2SO_4 a. 98g b. 196g c. 49g d. None	A	1 M solution contain 1 mole of solute dissolved in 1 liter. One mole of H_2SO_4 has mass 98 g $\text{As } n = \frac{\text{mass (g)}}{\text{molar mass}}$ $\text{Mass (g)} = n \times \text{molar mass}$ $= 1 \times 98 = 98 \text{ g}$
988)	If H_2SO_4 is 98% pure and its density is 1.24 g/cm^3 , the molarity of H_2SO_4 ? a. 12.4M b. 11.4 M c. 18M d. None of these	A	As density $1.24 \text{ g/cm}^3 = 0.0124 \text{ g/L}$ Now $\text{Molarity} = \frac{\text{Density} \times \% \text{ purity} \times 1000}{\text{Molecular mass}}$ $= \frac{0.0124 \times 98\% \times 1000}{98} = 12.4 \text{ M}$
989)	Molarity of pure water is a. 1 b. 18 c. 55.5 d. 6	C	Density of water $1000 \text{ Kg/m}^3 = \frac{1000 \times 10^3}{10^3}$ Density = 1000g/liter $M = d \times V = 1000 \text{ g}$ 1-liter water weight = 1000g Now moles = $\frac{1000 \text{ g}}{18} = 55.5$ Now molarity = $\frac{n}{V} = \frac{55.5}{1 \text{ liter}} = 55.5 \text{ M}$
990)	Solution contains 1 mole of alcohol and 4 moles of H_2O . the mole fraction of H_2O and alcohol will be a. 4/5 and 4/1 b. 4/1 and 1/4 c. 1/5 and 4/5 d. 4/5 and 1/5	D	For water = $\frac{n_{\text{water}}}{n_1 + n_2} = \frac{4}{1+4} = 4/5$ For alcohol = $\frac{n_{\text{alcohol}}}{N_1 + n_2} = \frac{1}{4+1} = 1/5$
991)	The sum of the mole fraction of	C	$X_1 + X_2 = 1$ always



the two components of a solution is always

- More than one
- Less than one
- Exactly one
- Not fixed

992)	A solution contains 'A, B and C components. The mole fraction of "A" and "C" are 0.25 and 0.35 respectively. The mole fraction of B will be	D	$X_A + X_B + X_C = 1$ $X_B + 0.25 + 0.35 = 1$ $X_B + 0.6 = 1$ $X_B = 1 - 0.6$ $X_B = 0.4$
993)	In 1 molal aqueous C_2H_5OH solution, the mole fraction of C_2H_5OH is:	C	$C_2H_5OH : H_2O$ For C_2H_5OH 1 molal aqueous C_2H_5OH means that it contains 1 mole of C_2H_5OH in 1000g of solvent 46g in 1000g = 1mole for H_2O $\frac{1000g}{18g} = 55.5 \text{ mole}$ So, $X_{Ethanol} = \frac{n_1}{n_1 + n_2} = \frac{1}{55.5 + 1} = \frac{1}{56.5} = 0.0177$
994)	One of the following methods of expressing concentration is independent of temperature. Which is that one?	B	Molality is independent of temperature As molality = $\frac{\text{no of moles of solute}}{\text{weight of solvent in Kg}}$
995)	Colligative properties are the properties of:	A	The assumption that solution properties are independent of nature of solute particles are valid for ideal and dilute solutions.

- Dilute solutions which behave as nearly ideal solutions
- Concentrated solutions which behave as nearly non-ideal solutions
- Both a and b
- Neither a nor b



996)	Which of the following will form an ideal solution? a. C_2H_5OH and H_2O b. C_6H_6 and CCl_4 c. $CHCl_3$ and CH_3COOCH_3 d. H_2O and HBr	B	C_6H_6 and CCl_4 are non-polar the attractive forces among them is very negligible, it will form ideal solution.
997)	For zeotropic mixture: a. $\Delta H = 0$ b. $\Delta V = 0$ c. it obeys Raoult's law d. all are correct	D	All are the conditions of zeotropic mixture.
998)	Elevation of boiling point is a property: a. Additive b. Constitutive c. Colligative d. None of these	C	Elevation of boiling is a colligative property
999)	Which one has maximum colligative effect? a. 1 M urea b. 1 M glucose c. 1 M $NaCl$ d. 1 M $FeCl_3$	D	Colligative property depends on the number of particle of solute $FeCl_3$ produces more particles (ion) $FeCl_3 \rightarrow Fe^{+3} + 3Cl^-$
1000)	The solution having the highest boiling point? a. 0.1 M $FeCl_3$ b. 0.1 M glucose c. 0.1 M Na_2SO_4 d. 0.1 M $Al_2(SO_4)_3$	D	Colligative property depends on number of particles of solute. As the concentration is same thus the $Al_2(SO_4)_3$ produces more ions and has higher elevation in boiling point.
1001)	What is the essential condition for colligative properties? a. Solution should be dilute b. Solute should be non-electrolyte c. Solute should be non-volatile d. All of them	D	All are the conditions of colligative property
1002)	The mechanical pressure which must be applied on a solution to prevent osmosis of the solvent into the solution through a semipermeable membrane is called: a. Osmotic pressure b. Vapour pressure	A	By definition



	c. Aqueous tension d. Atmospheric pressure		
1003)	Osmotic pressure is the example of a. Colligative property b. Additive property c. Optical property d. Constitutive property	A	Osmotic pressure depends on the number of solute particles.
1004)	Which solution has the highest osmotic pressure? a. 2g solute per 100g of H ₂ O b. 4g solute per 100g of H ₂ O c. 6g solute per 100g of H ₂ O d. 1g solute per 100g of H ₂ O	C	Osmotic pressure is given as $\pi = \frac{m}{mv} RT$ $\pi \propto m \text{ (mass of solute)}$
1005)	Which of the following solution has the highest elevation in boiling point? (a) 5.85% solution of NaCl (b) 18.0% solution of glucose (c) 6.0% solution of urea (d) All have same boiling point	(a)	All three solutions are 1 molar, but the number of solute particles is $2 \times 6.02 \times 10^{23}$ in NaCl solution since there are 1 mole of Na ⁺ and 1 mole of Cl ⁻ . Glucose and Urea solutions contain only 1 mole of solute particles in them. There is greater elevation of b.pt. for NaCl soln.
1006)	An aqueous solution of methanol in water has vapour pressure a) Equal to that of water b) Equal to heat of methanol c) More than that of water d) Less than that of water	(c)	Methanol is a low boiling liquid i.e. more volatile than water. When methanol is mixed with water, then vapour pressure of solution is less than the vapour pressure of pure methanol but higher than that of water.
1007)	A solution of glucose is 10%. The volume in which in 1 gram mole of it is dissolved will be (a) 1 dm ³ (b) 1.8 dm ³ (c) 200 dm ³ (d) 900 dm ³	(b)	10g glucose is dissolved in solution = 100 cm ³ 180 g (1 mole) glucose is dissolved in solution $= \frac{100}{10} \times 180 = 1800 \text{ cm}^3$
1008)	A solution of sucrose is 34.2%. The volume of solution containing one mole of solute (a) 500 cm ³ (b) 1000 cm ³ (c) 342 cm ³ (d) 3420 cm ³	(b)	34.2 grams sucrose is dissolved in volume of solution = 100 cm ³ 342 g (1 mole) sucrose is dissolved in volume $= \frac{100}{34.2} \times 342 = 1000 \text{ cm}^3$



1009)	Which one the following mixture of liquids show negative deviation form Raoult's law? (a) Ethyl alcohol and ether (b) HCl and water (c) Phenol-water (d) Chlorobenzene-bromobenzene	(b)	HCl when mixed with water, then HCl is ionized and attractions (associations) of H ₂ O molecules with the ions (H ⁺ and Cl ⁻) are stronger than hydrogen bonding in water when attractions increased between the components, then solutions deviates from Raoult's law.
1010)	The term cryoscopy is used for (a) Depression of freezing point (b) Elevation in boiling point (c) Lowering of vapour pressure (d) Osmotic pressure	(a)	The decrease in freezing point of a solution than freezing point of the pure solvent is called cryoscopy.
1011)	The term ebullioscopy is used for (a) Depression of freezing point (b) Elevation in boiling point (c) Lower of vapour pressure (d) None of the above	(b)	The addition of solute to the solvent raises the boiling point of the solution than that of pure solvent. It is called ebullioscopy.
1012)	Zeotropic mixture (a) Obey Henry's law (b) Obey Raoult's law (c) Does not obey Raoult's law (d) Obey Dalton's law	(b)	A solution which obeys Raoult's law is an ideal solution. And an ideal mixture of two liquids can be separated by fractional distillation. Such a mixture is zeotropic mixture.
1013)	Hydrolysis of potassium acetate produces (a) Acidic solution (b) Neutral solution (c) Basic solution (d) None of these	(c)	CH ₃ COOK is a salt of weak acid with strong base. The anions of weak acids hydrolyse in water (react) producing alkaline solution $\text{CH}_3\text{COO}^- + \text{H}^+ \rightleftharpoons \text{CH}_3\text{COOH} + \text{OH}^-$ The solution contains weak acid (CH ₃ COOH) and OH ⁻ ions making the solutions basic.
1014)	Which one of the following salts will not hydrolyze (a) NaCl (b) AlCl ₃ (c) Na ₂ CO ₃ (d) CH ₃ COONa	(a)	Na ⁺ ions are cation of strong base and Cl ⁻ ions are anions of strong acid. These do not hydrolyse in water. Thus solution is neutral.
1015)	The sum of mole fractions (X) of	(c)	The mole fraction of any component



components of solution is equal to

- (a) 100 (b) 200
(c) One (d) Zero

in the solutions is the ratio of its moles to the total number of moles i.e. ratio is less than 1. The sum of these ratios of all components of solution is equal to 1.

1016)	The vapour pressure of aqueous solution of sugar is (a) Equal to vapour pressure of water (b) More than vapour pressure of pure water (c) Less than vapour pressure of pure water (d) None of the above	(c)	Addition of non-volatile solute to the volatile solvent causes colligative properties of the solution. The escaping tendency of solvent particles from surface of the solution decreases due to presence of solute particles i.e. vapour pressure is decreased.
1017)	When NaCl is dissolved in water (a) Melting point decreases (b) Boiling point increases (c) Both melting and boiling points, decrease (d) None of above	(b)	Addition of solute to the solvent causes colligative properties. The boiling point of solution is higher than the boiling point of pure solvent.
1018)	Solubility curve of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ shows (a) Constant increase of solubility (b) Constant decrease of solubility (c) Discontinuously solubility with temperature (d) None of above	(c)	It is a combination of two solubility curves. At the break a new solid phase of anhydrous Na_2SO_4 appears and its solubility curve has different pattern from that of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$
1019)	use of glycol as anti-freeze in the automobile is an important application of (a) Colligative property (b) Raoult's law (c) Fractional crystallization (d) Raoult's law	(a)	Glycol is completely miscible with water and has very low vapour pressure and non-volatile in character. When it is mixed with water it lowers the freezing point of water i.e. used as antifreeze.
1020)	Use of NaCl in ice cream making is an important application of (a) Constitutive property (b) Additive property	(c)	Addition of NaCl to ice lowers melting point of ice i.e. freezing point of liquid water. It can act as a freezing mixture for use in an ice



	(c) Colligative property (d) Rault's law	cream machine.
1021)	Ethylene glycol is mixed with water as antifreeze in radiator because (a) It has low vapour pressure (b) It raises the boiling point of water (c) It lowers the freezing point of water (d) It has all characters	(d) Ethylene glycol acts as a non volatile solute when mixed with water. It causes all colligative properties. During winter it protects a car by preventing the liquid in the radiator from freezing and in hot summer it also protects the radiator from boiling over. It increases the liquid range of water in radiator.
1022)	Which one of the following is not soluble in alcohol (a) KCl (b) Urea (c) Acetone (d) Ether	(a) Mostly ionic compounds are soluble in water but insoluble in non-aqueous solvents. This happens due to the hydration of ions by water, but the other solvent cannot overcome the attraction between the ions.
1023)	Which one of the following is not conjugate solution (a) Ether + water (b) Phenol + water (c) Nicotine + water (d) Ethanol + water	(d) Ethanol is completely miscible in water and forms a homogeneous (single phase) solution. The other pairs form two layers due to partial miscibility.
1024)	Which one of the following has continuous solubility curve (a) NaCl (b) NaNO ₃ (c) Na ₂ SO ₄ (d) Both a and b	(d) NaCl and NaNO ₃ solubility curves in water are continuous and there are no sharp break.s
1025)	According to Raoult's law (a) Relative lowering of V.P. is equal to mole fraction of solute (b) The lowering of V.P. is directly proportional to the mole fraction of solute (c) V.P. of solvent above solution is equal to product of V.P. of pure solvent and mole fraction of solvent in solution	(d) All are definitions of Raoult's law.



(d) All of the above

1026)	The no of water of crystallization of MgCl	(b)	There are six H ₂ O molecules which are attached with MgCl ₂ , and all with Mg ⁺⁺ cations as it has greater charge density.
	(a) 12	(b) 6	
	(c) 3	(d) 4	
1027)	Freezing point depression is measured by	(a)	It is easy to perform form measuring depression in freezing point.
	(a) Beckmann's apparatus		
	(b) Land berger's method		
	(c) Antifreeze apparatus		
	(d) All of the above		
1028)	Elevation of boiling point is measured by	(b)	This is one of the best methods for the measurement of elevation of boiling point.
	(a) Backmann's apparatus		
	(b) Lands Berger's methos		
	(c) Antifreeze apparatus		
	(d) None of these above		
1029)	Colligative properties are the properties of solution that depend upon	(d)	The solute molecules present upon the surface of a solution decrease the evaporating capability of the solvent. Greater the number of solute molecules higher will be lowering of vapour pressure and other colligative properties of solution.
	(a) Nature of molecules		
	(b) Unit		
	(c) Physical property		
	(d) No. of molecules		
1030)	Aqueous solution of glucose boils at 100.52°C. the solution contains	(a)	It is 1 molar glucose solution. Elevation of boiling point of water is 0.52°C (constant) when there is 1 mole any solute dissolved in 1000 grams of solvent. And 1 litre water has mass equal to 1000 grams as the density of water is almost 1 g/cm ³ .
	(a) 180 gm glucose in 1 litre water		
	(b) 90 gm glucose in 1 litre water		
	(c) 18 gm glucose in 1 litre water		
	(d) 3.6 gm glucose in 1 litre water		
1031)	Aqueous solution of methanol is zerotropic mixture because	(c)	Solution of methanol in water distils over with a change in composition i.e. distillate have different composition from that of remaining liquid. The distillate is richer in more volatile liquid. Repeated distillation separates more volatile liquid from the water.
	(a) It does not obey the Raoult's law		
	(b) Mixture cannot be separated by sublimate		
	(c) Mixture can be separated by		



distillation
(d) Greater volume than the
volume of components

1032)	Homogenous mixture of two chemical substances, whose proportion can be varied is called (a) Solution (b) Mixture (c) Binary solution (d) Saturated solution	(c)	Two components homogeneous mixture is called binary solution.
1033)	Solution may have units (a) Molarity (b) Molality (c) Mole fraction (d) All of them	(d)	All are the concentration units used for solution.
1034)	Number of moles of solute per litre of solution is called (a) Molarity (b) Molality (c) Mole fraction (d) Normality	(a)	Definition of molarity i.e. moles of solute/dm ³ of solution.
1035)	Number of moles of solute per kg of solvent is called (a) Molarity (b) Molality (c) Mole fraction (d) Normality	(b)	It is definition of molarity.
1036)	A solution can be (a) Dilute and concentrated (b) Saturated and dilute (c) Saturated and unsaturated (d) Supersaturated and saturated	(d)	A solution that holds more solute than a saturated solution is called a supersaturated solution.
1037)	The amount of solute in the given amount of solvent is called (a) Molarity (b) Molality (c) Concentration (d) Solubility	(c)	This term represents amount of solute and solvent.
1038)	The ratio of number moles of a particular component of the solution to the total number of moles of all the components is called (a) Normality (b) Molarity (c) Molarity (d) Mole fraction	(d)	It is definition of mole fraction.



- 1039)** The process in which the solvent molecules are surrounded and interact with solute ions or molecules is called
 (a) Solvation (b) Hydration
 (c) Hydrogenation (d) None
- 1040)** The molarity of solution made by the 98 g of sulfuric acid is sufficient water to make 500 ml of solution is
 (a) 1 M (b) 0.5 M
 (c) 2 M (d) 3 M
- 1041)** The substance which contains the water of crystallization of water
 (a) Hydrated (b) Solvated
 (c) Crystal (d) None
- 1042)** Solution which contains the hydrogen ions more than the 10^{-7} M is said to be
 (a) Acidic (b) Basic
 (c) Neutral (d) None
- 1043)** If two or more than two substance appear to have nearly equal strengths in same solvent then the phenomenon is called
 (a) Reduction (b) Oxidation
 (c) Solvation effect (d) Levelling
- 1044)** Which is independent of temperature?
 (a) Molarity (b) Molality
 (c) Normality (d) Mole fraction
- 1045)** Molality of pure water is
 a. 36
 b. 55.5
 c. 18
- 1040)** Molarity

$$= \frac{\frac{\text{mass in g of solute}}{\text{molar mass of solute}} \times 1}{\text{volume of solution in dm}^3}$$
 Molarity = $\frac{98}{98} \times \frac{1}{0.50} = 2$.
- 1041)** The process in which water molecules surround and interact with solute ions or molecules is called hydration.
- 1042)** $[H^+ > 10^{-7}]$ means acidic nature.
- 1043)** When the concentration of two different solutes in the same solvent are equal, the solution is levelled.
- 1044)** The value of concentration unit in terms of molality does not change by the variation in temperature as this unit does not involve volume of the solution. Temperature change causes change in volume.



d. 1

1046)	If 14.6g of NaCl are dissolved in 250 mL of the solution, molarity of the solution will be a. 1 b. 0.5 c. 2 d. 0.25	a	
1047)	A 5% m/v sodium chloride solution means that a. 1.25g of NaCl are dissolved in 25 mL of the solution b. 5g of NaCl are dissolved in 50 mL of the solution c. 10g of NaCl are dissolved in 100 mL of the solution d. 5g of NaCl are dissolved in 200 mL of the solution	a	
1048)	Sum of mole fractions of all components of a solution is a. Less than one b. Greater than one c. Less or greater than one depending on the temperature d. Equal to one	d	
1049)	Parts per million (ppm) is equal to a. $\frac{\text{mass of solution}}{\text{mass of solute}} \times 10^6$ b. $\frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$ c. $\frac{\text{mass of solvent}}{\text{moles of solute}} \times 10^6$ d. $\frac{\text{moles of solute}}{\text{mass of solution}} \times 10^6$	b	
1050)	Mutual solubility of conjugate solution is affected by a. Temperature changes b. External pressure change c. Volume of conjugate solutions d. Densities of conjugate solutions	a	
1051)	Comparing the boiling points of different solutions of sodium	d	



chloride, solution having maximum boiling point among the following is

- a. 0.1 molal NaCl solution
- b. 0.2 molal NaCl solution
- c. 0.3 molal NaCl solution
- d. 0.4 molal NaCl solution

1052)	Comparing solubilities of hydrogen sulfide and oxygen at the same temperature and pressure in water	a	
	a. Hydrogen sulfide has greater solubility		
	b. Oxygen has greater solubility		
	c. Hydrogen sulfide and oxygen have unequal solubility		
	d. Hydrogen sulfide and oxygen have unequal solubilities		
1053)	Solubility of gasses in water	d	
	a. Increases with temperature		
	b. Decreases with pressure		
	c. Is not affected by pressure and temperature		
	d. Decreases with temperature		
1054)	All of the following are colligative properties except	d	
	a. Elevation in boiling point		
	b. Depression in freezing point		
	c. Osmotic pressure		
	d. Decrease in volume		
1055)	0.5 molar solution of sucrose contains	d	
	a. 171g of sucrose in 500 mL of solution		
	b. 342g of sucrose in 1000 mL of solution		
	c. 342 of sucrose in 500 mL of solution		
	d. 171g of sucrose in 1000 mL of solution		
1056)	0.25 molar solution of sodium chloride contains 29.25 g of sodium chloride in	d	
	a. 125 mL of solution		



- b. 250 mL of solution
- c. 500 mL of solution
- d. 2000 mL of solution

- 1057) K_b and K_f stands for c
- a. Ebullioscopic constant and molal boiling point elevation constant respectively
 - b. Cryoscopic constant and molal freezing point constant respectively
 - c. Ebullioscopic constant and molal freezing point constant respectively
 - d. Cryoscopic constant and ebullioscopic constant respectively

- 1058) Mole fraction of ethyl alcohol in a solution which contains 5 moles of ethyl alcohol and 5 moles of water will be d
- a. 1
 - b. 5
 - c. 10
 - d. 0.5

- 1059) Which one among the following ways of expressing the concentration of solution does not depends on the temperature? b
- a. Molarity
 - b. Molality
 - c. Normality
 - d. m/v % conc

1060)

CHAPTER 11

THERMOCHEMISTRY

- 1061) A piston in a gas supply pump has an area of 500 cm^2 and it moves a distance of 30 cm during one stroke. The pump moves the gas against a fixed pressure of 4000 Pa. A



the work done by the piston during on stroke is:

- A) 60 J B) 6.0×10^3 J
C) 6.0×10^5 J D) 6.0×10^7 J

1062)	Neutralization is always an exothermic phenomena. Which neutralization reaction given below evolves more heat: A) $\text{NaOH} + \text{HClO}_4$ B) $\text{KOH} + \text{HNO}_3$ C) $\text{NaOH} + \text{H}_2\text{SO}_4$ D) All evolve same heat.	D	
1063)	Students were decomposing CaCO_3 placed in a China dish by heating using burner in the laboratory. The "system" in this experiment is: a) China dish b) Burner c) Laboratory d) CaCO_3	D	
1064)	Addition of soluble impurities into a liquid & solid respectively causes: A) Increase in boiling point of liquid and decrease in melting point of solid B) Increase in both boiling and melting points C) Decrease in boiling point of liquid and increase in melting point of solid D) Decrease in both boiling and melting points.	A	
1065)	The study of heat changes accompanying a chemical reaction is known as (a) Thermo – chemistry (b) Thermodynamics (c) Electro chemistry (d) Chemical kinetics	A	The study of heat changes accompanying a chemical reaction is known as Thermo chemistry.
1066)	Which one of the following is not a state function? (a) Enthalpy (b) Free energy (c) Work (d) Energy	C	Work and energy are not state functions.



1067)	The first law of thermodynamics has a statement which implies that: (a) No heat enters or leaves the system (b) The temperature remains constant (c) All work is mechanical (d) Energy is conserved	D	The first law of thermodynamics has a statement which implies that Energy is conserved.
1068)	A chemical system is sealed in a strong rigid container at room temp and then heated vigorously change in work done during process is: (a) Positive (b) Negative (c) Zero (d) Constant	C	A chemical system is sealed in a strong rigid container so volume does not change and if no volume change occur, no work is done. $W = P \Delta V$
1069)	The change in enthalpy is a measure of the heat reaction at: (a) Constant volume (b) Constant pressure and volume (c) Variable pressure (d) Constant pressure	D	Enthalpy is the amount of heat entered or leaved at constant pressure.
1070)	The first law of thermodynamics has a statement which implies that: (a) No heat enters or leaves the system (b) The temperature remains constant (c) All work is mechanical (d) Energy is conserved	D	The first law of thermodynamics has a statement which implies that Energy is conserved.
1071)	The change in enthalpy at constant pressure, ΔH is equal to: (a) $\Delta H = q + P\Delta V$ (b) $\Delta H = qp = \Delta E - P\Delta V$ (c) $\Delta H = \Delta E + P\Delta V$ (d) $\Delta H = q - P\Delta V$	C	The change in enthalpy at constant pressure: $\Delta H = \Delta E + P\Delta V$
1072)	The enthalpy of the elements at 1 atm pressure and 298 K is arbitrary given the value of: (a) 0.1 (b) 1.0	D	The enthalpy at stander state has given value arbitrarily zero.



	(c) 29.8 (d) Zero		
1073)	The standard molar enthalpy of formation is denoted by: (a) ΔH (b) ΔH^0 (c) ΔH_{273}^0 (d) ΔH_{298}^0	B	ΔH^0 denote standard enthalpy change.
1074)	Select the correct statement about lattice energy: (a) The energy absorbed when 1 mole of ionic crystal Lattice is formed from its constituent ions in the gaseous state. (b) The energy liberated when 1 mole of an ionic crystal Lattice is formed from its constituent ions in the gaseous state (c) The energy liberated when 1 mole of an ionic crystal Lattice is splitted into its constituent ions in the gaseous state (d) None of the above	B	Definition of lattice energy; The energy liberated when 1 mole of an ionic crystal Lattice is formed from its constituent ions in the gaseous state.
1075)	The net heat change in a chemical reaction is same whether it takes place in one step or several steps. This law is known as (a) First law of thermodynamic (b) Henery's law (c) Hess's law (d) Joule's law	C	Hess' Law; The net heat change in a chemical reaction is same whether it takes place in one step or several steps.
1076)	Choose the correct statement about Born Haber cycle: (a) Born Haber cycle is a process for a applying Hess's law to the standard enthalpy changes in the formation of covalent compounds. (b) Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the formation of ionic compound. (c) Born Haber cycle is a process for applying Hess's Law to the standard enthalpy changes in the	B	Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the formation of ionic compound like NaCl.



	formation of ionic and covalent compounds. (d) None		
1077)	Which is not used in calculating the lattice energy of crystalline solids? a) Haber process b) Born Haber cycle c) Hess's law d) Enthalpy changes	A	Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the formation of ionic compound like NaCl.
1078)	Providing heat to the following reaction causes it shift to the right $\text{CO}_{2(g)} + 2\text{H}_2\text{O}_{(g)} \rightarrow \text{CH}_{4(g)} + 2\text{O}_{2(g)}$ The reaction can therefore be described as: a) Spontaneous b) Adiabatic c) Endothermic d) Exothermic	C	The burning of CH_4 is exothermic process while its backwards reaction is endothermic. The given reaction is backward reaction of burning of CH_4 .
1079)	For which of the following standard heat of formation is not zero: (a) $\text{Cl}_2(g)$ (b) $\text{Na}(s)$ (c) $\text{Br}_2(g)$ (d) $\text{Hg}(l)$	C	Only element in their standard state have zero standard heat of formation values.
1080)	Rusting is process a. Spontaneously b. Non spontaneous c. Redox d. Both a and c	C	<i>Rusting occurs spontaneously. It is redox reaction because iron corrodes in the presence of oxygen and water. Oxygen act as oxidizing agent while iron act as reducing agent.</i>
1081)	All of the following are endothermic except a. Evaporation b. Sublimation c. Condensation d. Ionization energy	C	Condensation is exothermic, because water is changing from gas phase into liquid water thus release energy.
1082)	Which of the following processes is endothermic? a. The condensation of steam b. The electrolysis of water c. The freezing of water d. $\text{Ca}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow \text{Ca}(\text{OH})_{2(aq)} + \text{H}_2(g)$	B	<i>Electrolysis reaction endothermic reaction because electrical energy is absorbed during this reaction.</i>
1083)	Which one is non spontaneous? a. Compression of gases	A	Compression of gas is not a natural tendency, gas can be compressed by



- b. Flow of heat from hot body to cold body
c. Diffusion of gases
d. Evaporation
- applying energy, so it is non-spontaneous.*

1084)	A balloon filled with oxygen is placed in freezer. Identify system a. Balloon b. Oxygen c. Freezer d. All of these	B	Oxygen is system is under study any region around the system is surrounding
1085)	The energy of the system and surrounding is conserved. This is a statement of a. Law of mass action b. Law of definite proportion c. Law of conservation of energy d. Second law of thermodynamics	C	In thermochemistry the energy of the system and the surrounding is conserved which is also law of conservation of energy.
1086)	Thermodynamics only concerned with a. Time required for reaction b. Physical state of system c. Chemical state of system d. Initial and final states of system	D	Thermodynamics deals only with the initial and final state of the system
1087)	Thermodynamics is the branch of science, which is based on a. Law constant composition b. Law conservation of energy c. Hess's law d. Carnot's principle	B	Thermodynamics is based on the law of conservation of energy.
1088)	The property of being able to add enthalpies is based on the a. Law of conservation of mass b. First law of thermodynamics c. Law of conservation of energy d. Both b and c	B	First law of thermodynamics is based on law of conservation of energy which enables it to add the enthalpies.
1089)	Thermodynamics are applicable to a. All type of system b. Macroscopic system c. Microscopic system	B	The law of thermodynamics applicable for energy changes involving macroscopic system



d. None of these

1090)	Which one is state function? a. ΔH b. ΔP c. ΔT d. H	D	Enthalpy is a state function. It depends only on the initial and final state not on the path. Enthalpy change is not a state function. $\Delta H = E$ in KJ/mol which does not have initial and final state.
1091)	Among the following the thermodynamically stable: a. Graphite b. Diamond c. White phosphorous d. Both a and c	D	The amount of heat gained or lost when one mole of substance form from element in standard state.
1092)	Which one cannot be determined accurately? a. H b. E c. Both a and b d. ΔH	C	Enthalpy and energy cannot be determined accurately, the change in enthalpy or energy can be determined accurately.
1093)	Which one has zero standard enthalpy of formation a. Diamond b. White phosphorous c. Graphite d. Both b and c	D	Diamond is not in standard state so its $\Delta H_f^\circ \neq 0$ (Graphite is the standard state of carbon).
1094)	Which one can be determined accurately? a. ΔH b. ΔE c. H d. Both a and b	D	Change is energy and enthalpy can be determined accurately while the enthalpy cannot be accurately determined.
1095)	$Q = \Delta H$ when: a. $\Delta V = 0$ b. $\Delta P = 0$ c. $\Delta E = 0$ d. none of these	B	As $H = E + PV$ When $\Delta P = 0$ Then $\Delta H = Q_p$ ΔH is change at constant pressure. Work will be done in this case.
1096)	For solids and liquids: a. $\Delta H = \Delta E$ b. $\Delta H = \Delta E + P\Delta V$ c. $\Delta H = \Delta E \Delta PV$ d. $\Delta E = 0$	A	In solid and liquid, the volume change is negligible so $\Delta V = 0$ now $\Delta H = \Delta E + P\Delta V$ and $\Delta H = \Delta E$
1097)	No work is done at constant:	B	When the volume is constant no



- a. P
b. V
c. T
d. None

distance is covered by the piston when a gas in a container. So, the work done will be zero.

1098)	The standard enthalpy of formation of all elements in their standard states are: a. Unity b. Zero c. Always positive d. Always negative	B	The standard enthalpy of formation of an element in its standard state is zero because it involves no change in energy
1099)	The amount of heat which is involved during the completion of a chemical reaction at 25°C and 1 atm pressure is called: a. Heat of neutralization b. Heat of formation c. Heat of combustion d. Enthalpy of reaction	D	By the definition of enthalpy of reaction
1100)	Which one of the following has standard enthalpy of formation is zero? a. $\text{Fe}_{(g)}$ b. $\text{Cu}_{(s)}$ c. $\text{C}_{(i)}$ d. $\text{Na}_{(g)}$	B	Cu is in standard state so its enthalpy of formation is zero.
1101)	Which one of the following pairs has maximum enthalpy of neutralization? a. $\text{HCl} + \text{NaOH}$ b. $\text{HCl} + \text{NH}_4\text{OH}$ c. $\text{KOH} + \text{CH}_3\text{COOH}$ d. $\text{NH}_4\text{OH} + \text{CH}_3\text{COOH}$	A	HCl is a strong acid and NaOH is a strong base so its enthalpy of neutralization will be maximum.
1102)	Which of the following gases have the highest heat of combustion? a. Methane b. Ethane c. Ethylene d. Acetylene	D	In acetylene the carbon has triple bond, which is strongest among the given option so its heat of combustion is highest. It release highest amount of energy.
1103)	Which one of the following equations shows standard enthalpy of combustion? a. $\text{CH}_{4(g)} + 2\text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} +$	A	Because $\Rightarrow \text{CH}_4$ is one mole $\Rightarrow \text{CH}_4$ is gas so in standard state It is combustible



- $2\text{H}_2\text{O}_{(\text{g})}$
 b. $\text{CH}_{4(\text{s})} + 2\text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})} + 2\text{H}_2\text{O}_{(\text{g})}$
 c. $2\text{CH}_{4(\text{g})} + 4\text{O}_{2(\text{g})} \rightarrow 2\text{CO}_{2(\text{g})} + 4\text{H}_2\text{O}_{(\text{g})}$
 d. $\text{CH}_{4(\text{l})} + 2\text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})} + 2\text{H}_2\text{O}_{(\text{g})}$

1104)	Which one shows the enthalpy of combustion? a. $\text{CH}_{4(\text{g})} + 2\text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})} + 2\text{H}_2\text{O}_{(\text{g})}$ b. $\text{CH}_{4(\text{s})} + 2\text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})} + 2\text{H}_2\text{O}_{(\text{g})}$ c. $2\text{CH}_{4(\text{g})} + 4\text{O}_{2(\text{g})} \rightarrow 2\text{CO}_{2(\text{g})} + 4\text{H}_2\text{O}_{(\text{g})}$ d. All of them	A	$\text{CH}_{4(\text{g})} + 2\text{O}_{2(\text{g})} \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ $\Rightarrow$ One mole of CH_4 is present $\Rightarrow$ It is in standard state at 25°C and 1 atm pressure $\Rightarrow$ It is combustible Obey all the conditions.
1105)	Which one is the application of enthalpy of solution? a. Instant cold pack b. Instant hotpack c. Both of them d. None of these	C	Enthalpy has many applications. One of them is instant cold pack and instant pack either by release or absorption of heat.
1106)	For a given process, the heat change at constant pressure (p) and constant volume (v) are related to each other as (a) $\Delta E = q + w$ (b) $E = q - w$ (c) $\Delta H = \Delta E + p\Delta v$ (d) $\Delta H = \Delta E$	(d)	For a process at constant pressure the heat change ΔH is given by relationship $\Delta H = \Delta E + p\Delta v$ For a constant volume $\Delta v = 0$ Therefore $\Delta H = \Delta E$
1107)	The neat heat change in chemical reaction is same whether it is brought in two or more different ways in one or several steps. It is known as (a) Henry's law (b) Joule's principle (c) Hess's law (d) Law of conservation of energy	(c)	Statement of hess's law: if chemical change takes place by several different routes, the overall energy change is same, regardless of the route by which chemical change occurs.
1108)	Enthalpy of neutralization of all the strong acids and strong ases is the same value because	(d)	Strong acids completely ionized to give H^+ ions and strong bases give OH^- .



	(a) Neutralization lead to the formation of salt and H_2O (b) Strong acid and base are ionic substances (c) Acids always given rise H^+ ions and bases always furnish OH^- ions (d) The net chemical change involve the combination of H^+ and OH^- ions to form water.		Then $H^+ + OH^- \rightarrow H_2O$ the heat released is called heat of neutralization.
1109)	If an endothermic reaction is allowed to take place very rapidly in the air. The temperature of the surrounding air (a) Remains constant (b) Increase (c) Decreases (d) Remain uncharged	(c)	The heat required for the reaction is taken from the reacting materials and the temperature of the system falls below the initial temperature. Heat flows from surroundings to the system.
1110)	In endothermic reactions, the heat content of the (a) Products is more than that of reactants (b) Reactants is more than that of products (c) Both a and b (d) None of the above	(a)	In an endothermic reaction, the enthalpy of products (H_2) is greater than that of the reactant (H_1). Therefore $\Delta H = H_2 - H_1$ is positive.
1111)	Pressure volume work is (a) PAV (b) $F \times d$ (c) hAv (d) $H + pv$	(a)	In pressure volume work the force becomes pressure and distance becomes volume change. And work = force x distance = $p\Delta v$
1112)	The condition for standard enthalpy change is (a) 1 atm 30°C (b) 1 atm 50°C (c) 1 atm 25°C (d) 760 atm 25°C	(c)	The standard enthalpy of a reaction (ΔH) is the enthalpy change which occurs under standard conditions i.e. 25°C (298K) and 1 atmospheric pressure.
1113)	Glass calorimeter reaction is one which we measure (a) Enthalpy of combustion	(b)	For most of the reactions (except combustion reactions) an ordinary glass calorimeter can be used to



- (b) Enthalpy of reaction
(c) Pressure volume work
(d) None of above

determine the value of ΔH (enthalpy of reaction)

1114)	Born-haber cycle is an application of (a) First law of thermodynamics (b) Second law of thermodynamics (c) First law of thermodynamics (d) Hess's law	(d)	Hess's law finds its best application in Born-Haber Cycle, which states that energy change in a cyclic process is zero or $\Delta H(\text{cycle})=0$
1115)	Lattice energy of NaCl (a) +5000 KJ (b) -344 KJ (c) -776 KJ (d) -411 KJ	(c)	It is calculated by Born-Haber Cycle $\text{Na} + \text{Cl}_{2(g)} \rightarrow \text{Na}^+_{(g)} + \text{Cl}^-_{(g)}$ $\Delta H_f \quad \quad \quad \Delta H_{\text{lat}}$ $\text{Na}^+ \text{Cl}^-$ $\Delta H_f^\circ = \Delta H_x + \Delta H_{\text{lat}}$ $\text{Or } \Delta H_{\text{lat}} = \Delta H_f^\circ - \Delta H_x = 411 - 365$
1116)	Standard enthalpy of Al_2O_3 cannot be measured because (a) It does not catch fire (b) It reacts with CO_2 (c) Protective layer of oxide cover the surface (d) None of the above	(c)	There are many compounds for which ΔH cannot be measured directly by calorimetric method. Such as Al_2O_3 also has problem for measurement of its standard enthalpy of formation. It is difficult to burn Al completely in oxygen because a protective layer of Al_2O_3 is formed which covers the surface of the un-reacted element.
1117)	When ammonium chloride dissolve in water this process is (a) Endothermic process (b) Exothermic process (c) Simple hydration (d) None of the above	(a)	The enthalpy of solution ($\Delta H_{\text{sol}}^\circ$) of NH_4Cl is + 16.2 KJ/mole. It indicates the cooling of water, in which NH_4Cl is dissolved. Therefore dissolution of NH_4Cl in water is endothermic.
1118)	Pumping of water uphill is (a) Spontaneous reaction (b) Exothermic reaction (c) Non-spontaneous reaction (d) Endothermic	(c)	Pumping of water uphill is done by supplying energy. So this process does not take place on its own i.e. it is not natural process.
1119)	The energy of the reactants is not	(a)	A system cannot destroy or create



equal to the energy of the products
this loss of energy is in the form of

- (a) Heat (b) Electron
(c) Any form of the energy (d)
None

energy. However it can exchange
energy with surrounding in the form
of heat.

1120)	Any substance under going physical or chemical change is said to be (a) Surrounding (b) System (c) Losphere (d) Lithosphere	(b)	The term system is used for anything (materials) under examination in the laboratory or under consideration in the classroom.
1121)	The sum of all the energies of atoms, molecule, ion, within system is called (a) Enthalpy (b) K.E. of the system (c) Internal energy (d) None	(c)	The sum of kinetic as well as the potential energies of the particles contained in the system is called internal energy.
1122)	Any property which depends upon the T.P and V is said to be (a) Property due to K.E (b) Property due to PE (c) Both a and b (d) Thermodynamic state	(d)	The state of system is the condition of a system. The initial and final states of the system are describe by temperature. Pressure and volume.
1123)	Work done is equal to the heat exchanged if _____ is kept constant (a) V (b) P (c) T (d) All	(b)	Work, a form in which energy is transferred from one system of the other. In chemistry it is pressure x volume work (expansion of gas). P is the external pressure which remains constant.
1124)	One calorie is equal (a) 4.132 J (b) 760 J (c) 4.184 J (d) 1 J	(c)	Units of energy.
1125)	Evaporation of water is _____ change (a) Endothermic (b) Exothermic (c) Non-energetic	(a)	There are many endothermic change that takes place spontaneously although these absorb heat e.g. evaporation of water $\text{H}_2\text{O}_{(l)} \rightarrow \text{H}_2\text{O}_{(g)} \quad \Delta H = +44.0$



	(d) None	KJ/mol
1126)	One joule is equal to (a) 1 Nm (b) 1 Kg/s (c) 1 Kg m ² /s ² (d) Both a and c	(c) 1 J = 1 Nm 1 N = 1 Kg m/s ² 1 J = 1 Kg m/s ² . m = 1 Kg m ² .s ²
1127)	Which is not state function (a) Temperature (b) Enthalpy (c) Entropy (d) internal energy	(c) It is the degree of disorder of the molecules
1128)	AE = q + w is the (a) First law of the thermodynamics (b) Second law of the thermodynamics (c) Third law of the thermodynamics (d) None	(a) A system can change energy with surroundings in the form of heat and work. Energy change is the sum of heat work, so that total energy of system and its surrounding remains constant.
1129)	The heat content of system is called (a) Internal energy (b) Enthalpy (c) Entropy (d) None	(b) Enthalpy is equal to the internal energy, E plus product of pressure and volume (Pv) i.e. H = E + Pv.
1130)	The amount of heat evolved or absorbed by keeping at room temperature is called (a) Heat of formation (b) Standard heat of formation (c) Standard enthalpy change (d) None	(c) The standard enthalpy of a reaction (AH ⁰) is the enthalpy change which occurs when certain number of moles of reactants indicated by balanced equation react to give products at 25°C and 1 atmospheric pressure.
1131)	The heat contents of all the elements in their standard state are taken to be (a) 1 (b) 2 (c) 0 (d) None	(c) Elements in their standard physical state have zero enthalpy.
1132)	Hess's law is a special case of (a) First law of thermodynamics (b) Second law of thermodynamics	(a) Hess's law is simply an application of the more fundamental law of conservation of energy. Mathematically the sum of enthalpy changes in a cyclic process is zero. It



	(c) Third law of the thermodynamics (d) None		is exactly the first law of thermodynamics
1133)	The amount of heat exchanged when molar quantities of reactants and products are used (a) Heat of sublimation (b) Heat of neutralization (c) Heat of reaction (d) None	(c)	When the reactants are in stoichiometric amounts. Then the heat energy evolved or absorbed is called heat of reaction.
1134)	The entropy of the universe (a) Constant (b) is equal to zero (c) Decreasing (d) Increasing	(d)	It is second law of thermodynamics that in every spontaneous process there is net rise in entropy. As the spontaneous processes are irreversible, there would be increase in entropy.
1135)	The measurement of degree of disorder is (a) Internal energy (b) Enthalpy (c) Entropy (d) None	(c)	It is definition of entropy
1136)	The branch of science which deals with the energy transformation is called (a) Thermo chemistry (b) Thermodynamics (c) Chemical kinetics (d) All	(b)	The exchange of energy with surrounding is according to first law of thermodynamics.
1137)	For an endothermic reaction the value of ΔE is denoted by (a) Positive sign (b) negative sign (c) Without any sign (d) None	(a)	According to relationship $\Delta E = q_v$, the change in internal energy of a system at constant volume is equal to the heat absorbed by the system. So ΔE is positive.
1138)	Which is used to measure heat of reaction (a) Calorimeter (b) Colorimeter (c) Bomb calorimeter (d) None	(a)	For most purposes, an ordinary glass calorimeter can be used to determine the heat of reaction.
1139)	Which of the following is directly	(d)	Entropy of a system depends upon



related with entropy

- (a) Pressure
(b) Degree of freedom
(c) Temperature
(d) Both b and c

temperature, internal energy and enthalpy. Entropy is randomness of the molecules.

- | | |
|---|--|
| 1140) When the degree of freedom increases the entropy _____
(a) Decreases
(b) Increases
(c) Remain same
(d) All | (b) When a solid changes to the liquid, with breaking down the orderly arrangement of the molecules, the entropy is increased. Gases have greater entropy than liquids. |
| 1141) Spontaneous reaction is such in which the system decreases its _____
(a) Energy
(b) Free energy
(c) Entropy
(d) All | (a) Usually in spontaneous reactions the systems process towards low energy state. |
| 1142) One B.T.U. = _____ J
(a) 4.16×10^{-3}
(b) 1.055×1^3
(c) 3.6×10^3
(d) None | (b) Energy is measured in industry in kilowatt-hour (KWh) and the British thermal unit (Btu). All form of energy are measured in Joules.
$1 \text{ Btu} = 1.055 \times 10^3 \text{ j.}$ |
| 1143) The heat of formation of graphite and P(white) is _____ KJ/mole
(a) 0.00
(b) -273.0
(c) +8.7
(d) 813.99 | (a) As these elements are in their standard states. By convention the enthalpy of every elements is arbitrarily assigned a zero value. |
| 1144) The heat of combustion is measured by
(a) Calorimeter
(b) Colorimeter
(c) Bomb calorimeter
(d) None | (c) For accurate determination of the enthalpy of combustion for food, fuel and other compounds Bomb calorimeter is usually used. |
| 1145) The amount of heat required to convert one mole of solid directly into its vapour state at STP is called as
(a) Molar heat of vaporization
(b) Standard heat of vaporization
(c) Heat of reaction | (a) Amount of heat absorbed when 1 mole of solid sublimates to give vapours at 0°C and 1 atmospheric pressure. It is not called standard heat of vapourization as for standard enthalpy change temperature should be 25°C (298 K) |



(d) Heat of neutralization

1146)	CHAPTER 12 ELECTROCHEMISTRY	
1147)	The best known and the most highly developed fuel cell is the hydrogen/ oxygen fuel cell. This is known as (a) Proton exchange membrane cell (b) Bacon cell (c) Regenerative cell (d) None of the above	B Fuel cell is also known as Bacon cell. (out of course but important for other entry test.)
1148)	Choose the incorrect statement about the corrosion? a) corrosion cannot be completely eliminated b) Employing modern techniques corrosion can be completely eliminated. c) Corrosion process can be slowed down by certain methods. d) the presence of acid oxide in the environment can accelerate the process of corrosion.	B corrosion cannot be completely eliminated but Corrosion process can be slowed down by certain methods
1149)	Food article spoilage involves oxidation reduction process to prevent this reaction we usually add: a) an oxidizing agents b) a reducing agent c) an acid d) a base	B Food article spoilage involves oxidation reduction process to prevent this reaction we usually add antioxidant means a reducing agent.
1150)	Choose the wrong statement; A) operating life of fuel cell is unlimited. b) electrode in fuel cell may be porous solid and may contain catalyst.	D operating life of fuel cell is unlimited, electrode in fuel cell may be porous solid and may contain catalyst, the fuel in the fuel cell can be gas, liquid, solid or solution. in fuel cell, the cell products are regenerated



	c) the fuel in the fuel cell can be gas, liquid, solid or solution. d) in fuel cell, the cell products cannot be regenerated		
1151)	The cathode in lead storage battery is made of: A) Lead B) Lead oxide C) Lead hydroxide D) None of the above	B	As on cathode reduction (gain of electron) takes place and lead oxide can gain electron, so cathode in lead storage battery is made of Lead oxide.
1152)	The oxidation state of carbon in Na_2C_2 is: A) +4 B) +2 C) -1 D) -4	C	$\text{Na}_2\text{C}_2 = 0$, So $2(+1) + 2C = 0$ & $2C = -2$ Thus $C = -2/2 = -1$.
1153)	If we pass current through the sucrose solution the galvanometer will not show any deflection because sucrose molecules: (a) Move towards cathodes (b) Move towards anode (c) React with water (d) Remain neutral	D	The galvanometer does not show deflection means that it remains neutral and does not move towards anode or cathode.
1154)	Substances dissolved in water react better because: (a) water brings them close (b) water helps them in bonding (c) water dissolves them in ions (d) water reacts with them	C	When substance dissolved in water, it changes into ions which move easily in water towards each other and react better.
1155)	Sodium hydroxide acts on Aluminum oxide to form: (a) NaAlO_3 (b) $\text{Na}_3\text{Al}_2\text{O}_6$ (c) NaAlO_2 (d) NaAl_2O_3	C	$\text{NaOH} + \text{Al}_2\text{O}_3 \rightarrow \text{NaAlO}_2$
1156)	In a Galvanic cell the following reaction takes place: $2\text{H}_2\text{O} \rightleftharpoons \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$, it occurs at; (a) Cathode (b) Anode (c) External conductor (d) Both a & b	D	As water loss electrons and we call it oxidation. Oxidation always occurs at anode.
1157)	Which statement is correct: (a) Standard Hydrogen Electrode (SHE) always acts as anode (b) 'SHE' may act as cathode or anode depending upon the	B	SHE act as anode as well as cathode depending upon the potential of joint elements.



reduction potential of the counterpart
(c) 'SHE' always acts as cathode in voltaic cells
(d) None of the above

1158)	The stronger the reduction potential the more difficult it is to: (a) Oxidize the compound (b) Reduce the compound (c) Electrolyze the compound (d) None of the above	A	The stronger the reduction the potential, the stronger it will reduce other and it will be difficult for it to oxidize other.
1159)	Which of the following cannot be displaced from their salt solution by copper? (a) Ag (b) Au (c) Pt (d) Zn	D	Because zinc loss electrons as compared to copper.
1160)	The emf of a galvanic cell can be calculated from (a) The size of the electrode (b) The pH of the solution (c) The amount of metal in the anode (d) The E^0 values of the half cell	D	emf of galvanic cell depend upon E^0 of the cell and is different for different elements.
1161)	What will happen if a block of copper metal is dropped into a beaker containing a solution of 1M FeSO_4 ? $\text{Cu}^{2+} + 2e \rightarrow \text{Cu}$ 0.34 V $\text{Fe}^{2+} + 2e \rightarrow \text{Fe}$ -0.44 V (a) The copper will dissolve with no other change (b) The copper will dissolve and Fe will be precipitated out (c) The copper will dissolve with the evolution of H_2 gas (d) No reaction will occur	D	The Reduction of Potential of copper is high while oxidation potential of Fe is high. In this case Fe has already lost electrons so Cu can not further oxidize it.
1162)	What will happen if a block of copper is dropped into a beaker containing a solution of 1.0 M of ZnSO_4 ? (a) The copper will dissolve with no other change (b) The copper will dissolve zinc	D	The reduction of potential of carbon is high while oxidation potential of Fe is high. In this case Fe has already lost electrons so Cu can not further oxidize it.



	metal will be deposited (c) The copper will dissolve with the evaluation of $H_2(g)$		
1163)	Which statement given below is not true for the reaction? $Fe^{3+} + e \rightarrow Fe^{2+}$ (a) Fe^{3+} is being reduced (b) The oxidation state of Fe has changed (c) Fe^{3+} could be referred to as a reducing agent in this reaction (d) Both Fe^{3+} and Fe^{2+} are called cations	C	Here Fe^{+3} have positive charge and can gain electrons, gaining of electrons is called reduction and so its oxidizing agent not reducing agent.
1164)	Select the strongest reducing agent: (a) Cl^{-1} (b) Ne (c) Na^{+} (d) Ca^{+2}	A	From given option Cl have negative charge and it can easily loss electron and loss of electron is called is oxidation and so reducing agent.
1165)	Considering the standard reduction chart, the strong reducing agent value is: (a) Small negative values (b) Large negative values (c) Small positive values (d) Large positive values	B	the more -Ve value of standard reduction potential in electrochemical series indicates the strong reducing agent.
1166)	The oxidation number of Cl in $Ca(ClO_3)_2$ (a) -1 (b) +3 (c) +5 (d) -6	C	
1167)	What is the oxidation number of hydrogen in metal hydrides (a) 0 (b) +1 (c) 2 (d) -1	D	In metal hydride the oxidation number of hydrogen is -1.
1168)	Which of the following is NOT considered to be an oxidizing agent? (a) MnO_2 (b) Cl_2 (c) $NaOH$ (d) Na_2O_2	C	
1169)	Primary cells are used in calculators for long service life the desirable quality of the cell is: (a) Low energy densities (b) No self discharge rates	B	Primary cell have no losses and can be used for long time.



	(c) High self discharge rates (d) High energy densities		
1170)	Lithium is generally used as an electrode in high energy density batteries, because (a) It is the lightest metal (b) It has high negative reduction potential (c) It is quite reactive (d) It does not corrode easily	B	Due to high reduction potential of Li it is used in lithium ion batteries.
1171)	$\text{PbSO}_{4(s)} + 2e^- \rightleftharpoons \text{Pb}_{(s)} + \text{SO}_4^{2-}$ - 0.36v $\text{PbO}_{2(s)} + 4\text{H}^+ + \text{SO}_4^{2-} + 3e^- \rightarrow \text{PbSO}_{4(s)} + 1.69\text{v}$ The two halfcell reactions above are involved in the discharge of a lead storage battery. The potential of a single cell lead storage is: (a) 1.33 volts (b) 4.10 volts (c) 2.66 volts (d) 2.06 volts	A	Cell potential = $E_{\text{anode}} + E_{\text{cathode}}$ (Anode is PbO_2 while Cathode is Pb) $1.69 - 0.36 = 1.33 \text{ Volt}$
1172)	Which statement is correct while recharging the automobile battery? (a) Pb is converted to PbO_2 . (b) PbSO_4 is converted to Pb (c) Pb is converted to PbSO_4 (d) None of the above	C	During Recharging both Pb and PbO_2 are converted to PbSO_4 while the reverse occurs in Discharging
1173)	The best known and the most highly developed fuel cell is the hydrogen/ oxygen fuel cell. This is known as (a) Proton exchange membrane cell (b) Bacon cell (c) Regenerative cell (d) None of the above	B	Fuel cell is also known as Bacon cell. (out of course but important for other entry test.)
1174)	Which of the following is the oxidizing agents in given reaction: $\text{Zn} + \text{Cu}^{2+} \longrightarrow \text{Zn}^{2+} + \text{Cu}$	D	Cu can gain electrons and zinc can loss. So gain of electrons is called reduction and so its oxidizing agent, Cu is oxidizing agent.



	(a) Cu^{+2} (b) Zu (c) Zu^{2+} (d) Cu		
1175)	Which is strong electrolyte? (a) $\text{Ca}(\text{OH})_2$ (b) SiCl_4 (c) KCl (d) SrCl_2	C	$\text{KCl}, \text{NaOH}, \text{H}_2\text{SO}_4$ are strong electrolytes.
1176)	Chromium compounds in which oxidation state of chromium is 2 + behaves as a: (a) Strong oxidizing agent (b) Strong reducing agent (c) Very weak oxidizing agent (d) Very weak reducing agent	B	Chromium have either +2 or +3. Chromium can loss one more electron to become +3 after +2 so it will los electron. Loss of electron is called oxidation and is strong reducing agent.
1177)	choose the true statement regarding the reaction given below $2\text{Na}_{(g)} + \text{Cl}_{2(g)} \rightarrow 2\text{NaCl}_{(s)}$ (a) Chloride is oxidized and sodium is reduced (b) Chlorine acts as an oxidizing agent and sodium as reducing agent (c) Chlorine acts as a reducing agent and (d) None of the above	B	Sodium loss electron and as oxidized and chlorine got reduced. So chlorine act as an oxidizing agent and sodium as reducing agent.
1178)	A cell is constructed of the following two half cells. What is E^0 of the cell? $\text{Ag}^+ + e^- \rightleftharpoons \text{Ag} \quad + 0.80 \text{ V},$ $\text{Al}^{3+} + 3e^- \rightleftharpoons \text{Al} \quad - 1.67 \text{ V}$ (a) 2.47 V (b) 0.087 V (c) - 0.87 V (d) 5.81 V	A	As both values are of reduction so larger will be same and smaller value sign will be change $0.80 + 1.67 = 2.47$
1179)	Which of the following is spontaneous reaction? (a) $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$ (b) $2\text{NaCl}_{(g)} \rightarrow 2\text{Na}_{(g)} + \text{Cl}_{2(g)}$ (c) $\text{Zn}^{2+} + \text{Cu} \rightarrow \text{Zn} + \text{Cu}^{2+}$ (d) $2\text{Fe}(\text{OH})_3 \rightarrow 2\text{Fe} + 3\text{O}_2 + 3\text{H}_2$	A	A because it can occur by itself
1180)	In which of the following reaction hydrogen acts as oxidizing agent. (a) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$ (b) $\text{C}_2\text{H}_4 + \text{H}_2 \rightarrow \text{C}_2\text{H}_6$	C	$2\text{Na} + \text{H}_2 \rightarrow 2\text{NaH}$, In this reaction hydrogen loss electrons and sodium gain it, so loss of electrons occurs in oxidizing agents.



	(c) $2\text{Na} + \text{H}_2 \rightarrow 2\text{NaH}$ (d) $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$		
1181)	Which is strong electrolyte? (a) $\text{Ca}(\text{OH})_2$ (b) SiCl_4 (c) KCl (d) SrCl_2	C	KCl , NaCl and H_2SO_4 are strong electrolytes
1182)	A cell is constructed of the following two half cells. What is E° of the cell? $\text{Ag}^0 + \text{e}^- \rightleftharpoons \text{Ag} \quad + 0.80 \text{ V}$, $\text{Al}^{3+} + 3\text{e}^- \rightleftharpoons \text{Al} \quad - 1.67 \text{ V}$ (a) 2.47 V (b) 0.087 V (c) - 0.87 V (d) 5.81 V	A	As both values are of reduction so larger will be same and smaller value sign will be change $0.80 + 1.67 = 2.47$
1183)	An electric current is passed through an aqueous solution of the following. Which one shall decompose? a. Urea b. Glucose c. AgNO_3 d. acetone	D	AgNO_3 is an electrolyte in an aqueous solution while all the other are organic in nature which is non-electrolyte in aqueous solution.
1184)	Which of the following when dissolved in water and placed in conductivity apparatus would cause the light to glow: a. table salt b. ethyl alcohol c. sugar d. glycerin	A	Table salt (NaCl) is electrolyte, the solvated sodium and chloride ions carry charges through the solution, completing the circuit electricity because the ions produced can move through them.
1185)	Electrolytic solutions conduct electricity because of a. the charged ions can move through them b. the charged ions cannot move through them c. the potential difference d. zero potential difference	A	Electrolyte solutions conduct electricity because the ions produced can move through them.
1186)	Which one of the following is the reduction reaction a. $\text{Br}_2 \rightarrow 2\text{Br}$ b. $\text{Fe}^{+2} \rightarrow \text{Fe}^{+3}$ c. $\text{Zn} \rightarrow \text{Zn}^{+2}$ d. $\text{Sn}^{+2} \rightarrow \text{Sn}^{+4}$	A	Reducing is the gain of electron in $\text{Br}_2 \rightarrow 2\text{Br}^-$ Bromine gain one electron to form the bromide ions.



- 1187)** The reaction,
 $\text{Cu} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{SO}_2 + \text{H}_2\text{O}$ is
 a. Oxidation
 b. Reduction
 c. Redox reaction
 d. None of these
C It is a redox reaction both oxidation reaction and reduction reaction are involved.
- 1188)** The reaction, $\text{CO}_2 \rightarrow \text{C} + \text{O}_2$ is
 a. Oxidation
 b. Reduction
 c. Neutralization
 d. Both a and b
*D In the reaction $\text{CO}_2 \rightarrow \text{C} + \text{O}_2$
 $\text{Cu}^0 \rightarrow \text{Cu}^{2+}$ = oxidized
 $\text{S}^{6+} \rightarrow \text{S}^{4+}$ = reduced
 Carbon oxidation state change from 4 to 0 = reduction
 Oxygen oxidation states change -2 to 0 = oxidation*
- 1189)** Which one of the following is a reduction reaction?
 a. $\text{Cl}_2 \rightarrow 2\text{Cl}$
 b. $\text{Na} \rightarrow \text{Na}^{+1}$
 c. $\text{Zn} \rightarrow \text{Zn}^{+2}$
 d. $\text{Sn}^{+2} \rightarrow \text{Sn}^{+4}$
*A $\text{Cl}_2 \rightarrow 2\text{Cl}$
 Cl_2 gain two electrons to form 2Cl so it is a reduction reaction.*
- 1190)** What is the oxidation state of "Cr" in $\text{K}_2\text{Cr}_2\text{O}_7$?
 a. +6
 b. +12
 c. +3
 d. +2
*A $\text{K}_2\text{Cr}_2\text{O}_7$
 $\text{K} = +1$, $\text{O} = -2$
 $\text{Cr} = x$
 So $(+1)2 + 2(x) + (-2) \times 7 = 0$
 $+2x - 14 = 0$
 $2x - 12 = 0$
 $2x = 12$
 $x = 12/2 = 6$*
- 1191)** The oxidation no of phosphorous in the compounds $[\text{PCl}_4]^+$ and $[\text{PCl}_6]^-$ are respectively
 a. +1 and -1
 b. +2 and -6
 c. +5 and +3
 d. +5 and +5
*D In $[\text{PCl}_4]^+$
 $\text{P} = x$, $\text{Cl} = -1$
 $x - 4 = +1 \Rightarrow x = 5$
 In $[\text{PCl}_6]^-$
 $x - 6 = -1 \Rightarrow x = 6 - 1 \Rightarrow x = 5$*
- 1192)** The oxidation no of Fe in $\text{K}_3\text{Fe}(\text{CN})_6$ is
 a. +2
 b. +3
 c. +4
 d. +5
*B $\text{K}_3\text{Fe}(\text{CN})_6$
 $\text{K} = +1$, $\text{CN} = -1$
 $\text{Fe} = x$
 Charge on co-ordination sphere = -3
 $x - 1(6) = -3$
 $x - 6 = -3 \Rightarrow x = 3$*
- 1193)** The atomic mass of oxygen is
B Oxygen atomic mass = 16g/mol



16gmol^{-1} , its gram equivalent is:

- 16
- 8
- 32
- 4

So equivalent weight of oxygen is =

$$\frac{\text{atomic mass}}{\text{valancy}} = \frac{16}{2} = 8\text{ g}$$

1194)	What is the gram equivalent of H_2SO_4 ? 98 49 100 50	B	Molecular mass of $\text{H}_2\text{SO}_4 = 98\text{g/mol}$ 1mole H_2SO_4 produces 2moles of hydrogen ions So, its equivalent weight is = $\frac{98\text{g}}{2} = 49\text{g}$
1195)	Given standard reeduction potential for $\text{Fe}^{+2} + 2\text{e}^- \rightarrow \text{Fe} - 0.440\text{V}$ $\text{Fe}^{+3} + 3\text{e}^- \rightarrow \text{Fe} - 0.036\text{V}$ The standard electrode potential for $\text{Fe}^{+3} + \text{e}^- \rightarrow \text{Fe}^{+2}$ is: -0.476 +0.476 0.404 -0.404	C	$\text{Fe}^{+3} + \text{e}^- \rightarrow \text{Fe}^{+2}$ Fe^{+3} convert into Fe^{+2} , it means one electron is gained by Fe^{+2} so for one electron, from data standard reduction potential = $-0.036\text{V} - (-0.440\text{V}) = 0.404$
1196)	If the reduction potential is positive, this indicates that - The reaction will not occur - The reaction will occur - The reaction will occur if heat energy is added - Both a and c	B	It E° cell is positive, the reaction is feasible and spontaneous.
1197)	Rusting of iron in most air involves - Hydration of iron - Loss of electrons - Gain of electrons - Neither gain nor loss	B	In rusting of iron, iron losses electrons At anode: $\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$ $\text{Fe}^{2+} \rightarrow \text{Fe}^{+3} + 1\text{e}^-$ Oxygen gain electrons in the presence of water. At cathode: $\text{O}_2 + 4\text{H}^+ + 4\text{e}^- \rightarrow 4\text{OH}^-$ Net rection: $\text{Fe}^{+3} + 3\text{OH}^- \rightarrow \text{Fe}(\text{OH})_3$ (rust)
1198)	Which one of the following is a catalyst in rusting of iron? H^+ - Zn O_2	A	H^+ produced from water in the rusting of iron and act as a catalyst.



	d. Pt		
1199)	What is the product of corrosion a. Oxide b. Nitride c. Hydride d. Halide	A	<i>Ferric hydroxide $Fe(OH)_3$ is the product of corrosion or the product is hydrated iron oxide.</i>
1200)	What is the mathematical form of Faraday's second law of electrolysis? a. $W = \frac{lte}{F}$ b. $W = Z I t$ c. $W = 2F$ d. $\frac{w_1}{w_2} = \frac{e_1}{e_2}$	D	<i>According to Faraday's second law $W \propto e$ (e = chemical equivalent, w = amount of substance) Now $\frac{w_1}{w_2} = \frac{e_1}{e_2}$ W_1 = Weight of first element W_2 = weight of second element E_1 = chemical equivalent of first element E_2 = chemical equivalent of 2nd element</i>
1201)	When a copper wire is dipped in 1M HCl. What will happen? a. No reaction occurs b. Vigorous reaction occurs c. H_2 gas is liberated d. None	A	<i>Copper metal is below hydrogen in the activity list or electrochemical series. It cannot replace hydrogen thus no reaction will occur.</i>
1202)	What will happen when nickel wire is placed in a solution of silver nitrate a. Reaction occur b. Reaction not occur c. Silver is precipitated d. Both a and c	D	<i>Ni electrode is above Ag electrode in electrochemical series so Ni will displace Ag and a spontaneous reaction will occur and Ag is precipitated. $Ni_{(s)} + 2AgNO_{3(aq)} \rightarrow Ni(NO_3)_{2(aq)} + 2Ag$</i>
1203)	When a small piece of calcium is added in a beaker of cold water a. H_2 gas liberated b. Basic solution form c. No reaction occur d. Both a and b	D	<i>Calcium being very active metal and above hydrogen in activity series it reacts with cold water and liberate hydrogen as H_2 gas $Ca_{(s)} + 2H_2O_{(l)} \rightarrow Ca(OH)_{2(aq)} + H_{2(g)}$</i>
1204)	The oxidation number of chromium in $K_2Cr_2O_7$ is (a) 14 (b) 12 (c) 6 (d) None of these	(c)	<i>Oxidation number of K = +1, and that of O = -2, Cr = x. By putting these values in the formula $K_2Cr_2O_7$ $2(+1) + 2(x) + 7(-2) = 0$ Or $2x = -2 + 14 = +12$</i>



		X = +6 or oxidation number of Cr = +6
1205)	In the reaction $2\text{Fe} + \text{Cl}_2 \rightarrow 2\text{FeCl}_3$ (a) Fe is reduced (b) Fe is oxidized (c) Cl_2 is oxidized (d) None of these	(b) Oxidation number of Fe(iron element) = zero. While oxidation number of Fe in FeCl_3 is +3. Therefore Fe change from zero to +3 i.e. Fe is oxidized.
1206)	When fused PbBr_2 is electrolyzed then (a) Bromine appears at cathode (b) Lead deposited at the cathode (c) Lead appears at the anode (d) None of these happens	(b) Fused PbBr_2 ionizes $\text{PbBr}_2 \rightarrow \text{Pb}^{++} + 2\text{Br}$. Cations go to cathode and anions to anode. Therefore at cathode $\text{Pb}^{++} + 2\text{e}^- \rightarrow \text{Pb}$ (Lead is deposited)
1207)	During electrolysis of KNO_3 , H_2 is evolved (a) Anode (b) Cathode (c) Both a and b (d) None	(b) When electrolysis of aqueous solution of KNO_3 is carried out the K^+ ions are not reduced at cathode, instead H_3O^+ ions produced by weak ionization of water are reduced at cathode. At cathode $\text{H}_3\text{O}^+ + \text{e}^- \rightarrow \text{H} + \text{H}_2\text{O}$ $\text{H} + \text{H} \rightarrow \text{H}_2$ The reduction potential of K^+ ion is -2.925, but E_{red}^0 of H^+ is 0.0 volts, higher than that of K^+ .
1208)	An electrochemical cell is based upon (a) Acid-base reaction (b) Redox reaction (c) Nuclear reaction (d) None of the above	(b) Electrochemical cells are of two types (i) Electrolytic cell and (ii) Galvanic cell Electrolytic cell passage of electricity carries out non-spontaneous redox chemical reaction. Galvanic cell Spontaneous redox reaction generates electricity.
1209)	Which of the following will be good conductor of electricity (a) Pure distilled water (b) Molten NaCl (c) Dilute solution of glucose	(b) Molten $\text{NaCl} \rightarrow \text{Na}^+ + \text{Cl}^-$ contains mobile ions which conduct current.



(d) Chloroform

1210)	During redox reaction an oxidizing agent (a) Gains electrons (b) Is oxidized (c) Loses electron (d) Hydrolyses	(a)	An oxidizing agent has higher value of standard reduction potential i.e. Has greater tendency to accept electrons to undergo reduction. Hence it removes electrons from the other atoms and oxidizes them by increasing their oxidation number.
1211)	In an oxidation process the oxidation number of the element (a) Increases (b) Decreases (c) does not change (d) None of these	(a)	Removal of electrons from an atom or ion is called oxidation process. It increases the oxidation number of the element.
1212)	Oxidation number of oxygen of OF_2 is (a) +1 (b) -1 (c) +2 (d) -2	(c)	Oxidation number of F = -1 and that of O = x Therefore $x + 2(-1) = 0$ or $x - 2 = 0$ or $x = +2$
1213)	During electrolysis of H_2SO_4 the O_2 is evolved at (a) Cathode (b) Anode (c) Both a and b (d) None of these	(b)	In aqueous H_2SO_4 the ions H_3O^+ , SO_4^{2-} , OH^- , the OH^- ions produced due to weak ionization of H_2O . At anode the OH^- ions are discharged first than SO_4^{2-} ions. At anode $4\text{OH}^- \rightarrow 4\text{OH} + 4\text{e}^-$ $4\text{OH} \rightarrow 2\text{H}_2\text{O} + \text{O}_2$
1214)	Which element acts as a reducing agent in the reaction $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ (a) Zn (b) H (c) S (d) O	(a)	In this reaction Zn is replacing H_2 . The oxidation number of H is reduced from +1 to zero i.e. H^+ is reduced. This reduction is carried out by Zn. Therefore Zn acts as reducing agent.
1215)	Electric current passes through both molten and solution form of NaCl because of (a) Ionic bonding (b) Na^+ and Cl^- ions (c) Ions of water (d) Hydration of ions	(b)	In both form NaCl crystal ionized into Na^+ and Cl^- , which are in motion. Therefore these conduct current.
1216)	Oxidation number of Sulphur in	(a)	Oxidation number of O = 2, that of S



SO_3 is (a) +6 (b) -2 (c) +2 (d) +4		= x Therefore $x + 3(-2) = 0$ or $x - 6 = 0$ or $x = 6$
1217) Metallic conduction is due to the (a) Movement of electrons (b) Movement of ions (c) Both a and b (d) None of these	(a)	In metallic crystals all metal atoms lose their valence electrons and atoms changed to positive ions. The electrons are moving freely and make an electrons pool around positive ions. The positive ions are stationary. The mobile electrons conduct electricity
1218) The process in which electric current is used to carry out a non-spontaneous redox reaction is called (a) Electrolyte (b) Electrolysis (c) methalic conduction (d) None of these	(b)	When an electric potential is applied into an electrolyte then a non-spontaneous redox reaction takes place by migration of positive ions towards cathode and negative ions towards anode. It si called electrolysis.
1219) The process in which ionic compound when fused or dissolved in water splits up into charged particles is called (a) Electrolysis (b) Hydration (c) Ionization (d) Conduction	(c)	Upon heating or in aqueous solution the ionic attractions of an ionic crystal break down into positive and negative ions. It is called ionization.
1220) Consider the following spontaneous reaction $\text{Ni}^{2+} + \text{Mn} \rightarrow \text{Ni} + \text{Mn}^{2+}$ If a voltaic cell is made based on this reaction then conventional representation of the cell will be a. $\text{Ni}, \text{Ni}^{2+} \parallel \text{Mn}^{2+}, \text{Mn}$ b. $\text{Mn}, \text{Mn}^{2+} \parallel \text{Ni}^{2+}, \text{Ni}$ c. $\text{Mn}^{2+}, \text{Mn} \parallel \text{Ni}, \text{Ni}^{2+}$ d. $\text{Ni}^{2+}, \text{Ni} \parallel \text{Mn}, \text{Mn}^{2+}$	B	
1221) Fours statements are given below. The correct statement is. a. Oxidation state of N in NO and N_2O_5 is +5 and +2 respectively b. Oxidation state of N in No and N_2O_5 is +1 and +5	C	



respectively

- c. Oxidation state of N in NO and N_2O_5 is +2 and +4 respectively

1222)	Which of the following statement is correct for the life period of a galvanic cell a. It increases with increase in concentration of cathodic solution b. It increase with increase in concentration of anodic solution c. It increases with increase in the size of the cathode d. It increase with decreases in the size of the anode	A
1223)	A spontaneous reaction is for a galvanic cell as a non-spontaneous reaction is for a. Nelson's cell b. Down's cell c. Electrolytic cell d. Daniel cell	C
1224)	The branch of chemistry which deals with the inter conversion of electrical energy and chemical energy is a. Thermochemistry b. Chemical kinetics c. Electrochemistry d. Stoichiometry	C
1225)		

CHAPTER 13

S AND P BLOCK ELEMENTS

1226)	What is the product when chlorine gas is passed over element silicon in powdered state and heated it produce colorless liquid having formula?	B
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- A. SiCl_2 B. SiCl_4
C. Si_2Cl_3 D. SiCl

- 1227)** Chlorine gas dissolves in water to some extent to give:
A. Yellow Colored solution
B. Greenish Colored solution
C. Bluish Colored solution
D. Colorless solution

- 1228)** Compound resistant to thermal decomposition is: D
A. Li_2CO_3 B. NaNO_3
C. $\text{Ba}(\text{NO}_3)_2$ D. Na_2CO_3

- 1229)** Phosphorus (white) catches fire in air and and burns with the formation of white smoke the product formed is: D
A. Phosphorus (iii) oxide
B. Phosphorus (v) Oxide
C. Phosphorus (ii) oxide
D. Both (A) & (B)

- 1230)** Steam of chlorine is passed over heated sulphur and form an orange coloured foul smelling liquid having formula:
A. SCl_2 B. S_2Cl_2
C. S_2Cl D. Mixture of SCl_2 and S_2Cl_2

- 1231)** The compound which purely acidic character is: C
A. $\text{Mg}(\text{OH})_2$ B. $\text{Al}(\text{OH})_3$
C. $\text{Si}(\text{OH})_4$ D. Non of the above

- 1232)** The flame colour of Na is yellow, Ca is brick red and Ba is apple green. Which radiations among the following travel with highest velocity D
A) Yellow B) Green
C) Violet D) All travel with the same.

- 1233)** Thermal stability is related to the polarizing power of the cation in the compound. Which of the following compounds having cation



with a strong polarizing power?

- A) MgCl_2 B) AlCl_3
C) LiCl D) BaCl_2

1234)	Compound having the ability of showing inert pair effect is: A) NH_3 B) H_2O C) SnCl_2 D) All of the above	C	
1235)	Select hydrogen carbonate which is comparatively most stable towards thermal decomposition. A) NaHCO_3 B) KHCO_3 C) RbHCO_3 D) C_2HCO_3	D	
1236)	White phosphorous catch fire spontaneously in air forming mixture of oxides. Select the correct oxides: A) P_4O_6 and P_2O_3 B) P_5O_{10} and P_3O_6 C) P_2O_4 and P_4O_8 D) P_4O_6 and P_4O_{10}	D	
1237)	The cation that distort the electron cloud of NO_3^- ion more and facilitates its decomposition is: A) Mg^+ B) Mg^{++} C) Cs^+ D) Be^{++}	A	
1238)	Three reactions are given $\text{H}_2\text{SO}_4 + 2\text{HF} \rightarrow \text{F}_2 + \text{SO}_2 + 2\text{H}_2\text{O}$ $\text{H}_2\text{SO}_4 + 2\text{HBr} \rightarrow \text{Br}_2 + \text{SO}_2 + 2\text{H}_2\text{O}$ $\text{H}_2\text{SO}_4 + 8\text{HI} \rightarrow 4\text{I}_2 + \text{H}_2\text{S} + 4\text{H}_2\text{O}$ The strongest reducing agent in these reactions is: A) HI B) HF C) HBr D) All of the above	A	
1239)	SiO_2 is the only oxide that reacts with: A) HCl_{aq} B) KOH_{aq} C) Steam D) SO_3	B	
1240)	Whenever Pb shows inert pair effect it always form: A) Ionic bond B) Covalent bond C) Co-ordinate covalent bond	A	



D)Metallic bond.		
1241)	Choose the correct reaction: A) $\text{PbO} + 4\text{NaOH} \rightarrow \text{Pb}(\text{OH})_4 + 2\text{Na}_2\text{O}$ B) $\text{PbO} + 2\text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}_2[\text{Pb}(\text{OH})_4]$ C) $\text{PbO} + \text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}[\text{Pb}(\text{OH})_3]$ D) $\text{PbO} + 4\text{NaOH} + \text{H}_2\text{O} \rightarrow \text{Na}_4[\text{Pb}(\text{OH})_6]$	B
1242)	Which one would you class it as more metallic in character? (a)As (b)Bi (c)C (d)Sb	B B/c in periodic table on going across a period, the Metallic character decreases i.e. with increase in Atomic number, b/c size of Atom decreases & attraction for e is greater on Right Side of Periodic Table, while in group, going down the metallic character increases
1243)	Which one of the following compounds has last ionic character? (a) CCl_4 (b) KCl (c) MgCl_2 (d) BaCl_2	A B/c as the metallic character across a period decreases, so the halides for Med show a decrease in Ionic and increase in covalent character. Halides of Alkali & Alkaline metals are generally ionic while those of VI & VII are covalent in Nature.
1244)	Hydration energy is the heat evolved or absorbed when: (a) One mole of gaseous ions is dissolved in one mole of water (b) One mole of ions in solid state is dissolved in one mole of water. (c) One mole of gaseous ions is dissolved in water to give infinitely dilute solution (d) One mole of ions in solid state is dissolved to form concentrated solution	C
1245)	Which of the following ions has largest heat of hydration; (a) Ba^{+2} (b) K^{+1} (c) Li^{+1} (d) Be^{+2}	D B/c Hydration energy highly depend upon charge/size Ratio. Eg; for given set of ions of group; charge to size ration decreases, the hydration energy also decreases on contrary, the



hydration energy increase significantly by moving from left to righting periods as the charge to size ration increases as found in metal of 3rd period.

1246)	The behavior of PbCl_2 and PbCl_4 respectively are: (a) Ionic and covalent (b) Covalent and ionic (c) Covalent and coordinate covalent (d) Ionic and coordinate covalent	A	B/c generally the halides of lower oxidation state are ionic & those of higher oxidation state tend to be covalent. * PbCl_2 is ionic * PbCl_4 is covalent
1247)	Which one will show ionic bonding? (a) NaH (b) PbCl_4 (c) HCl (gas) (d) PCl_3	A	
1248)	The hydrides of Be and Mg are classified as intermediate hydrides. Their behavior is: (a) Non-volatile and ionic in nature (b) Volatile and covalent in nature (c) Polymeric and covalent in nature (d) Crystalline and covalent in nature	C	
1249)	The bond form between boron and Hydrogen is: a) Ionic (b) Covalent (c) Coordinate covalent none of the above (d) None of the above	B	
1250)	In which of the following a covalent bond is not likely to exist? (a) Br (b) SiF_4 (c) CaO (d) CH_4	C	because ionic bond is for [Med] between strong electro positive and least electro positive atoms.
1251)	Select the most stable covalent hydride:	C	



	(a) BiH ₃ (b) NH ₃ (c) HF (d) SbH ₃		
1252)	Most of the oxides of non-metals combine with water to form: (a) hydrogen gas (b) salt and water (c) a base (d) An acid	D	
1253)	A metallic oxide when added to water would most likely form a(n) (a) Base (b) Acid (c) Salt (d) Basic anhydride	A	
1254)	Which one of the following forms the most acidic oxide: (a) Al (b) Si (c) Fe (d) P	D	
1255)	Select the oxide which will be acidic in nature: (a) P ₂ O ₅ (b) CaO (c) K ₂ O (d) BaO	A	
1256)	16. Choose the correct order of decreasing basic strength. (a) MgO > Na ₂ O > P ₄ O ₁₀ > Al ₂ O ₃ (b) Na ₂ O > MgO > Al ₂ O ₃ > P ₄ O ₁₀ (c) P ₄ O ₁₀ > Na ₂ O > MgO > Al ₂ O ₃ (d) Al ₂ O ₃ > MgO > P ₄ O ₁₀ > Na ₂ O	B	
1257)	Which one of the following oxides exhibit amphoteric properties? (a) K ₂ O (b) MgO (c) ZnO (d) CaO	C	Oxides of relatively less-electro +tive elementS i.e; BeO, Al ₂ O ₃ , Bi ₂ O ₃ & ZnO are amphoteric.
1258)	Calcium is found in nature as CaSO ₄ ·2H ₂ O. This is commercially called: (a) Epsom salt (b) Dolomite (c) Magnesite (d) Gypsum	D	Epsom salt – Mgso ₄ .7H ₂ O, Dolomite – Mg Co ₃ – Ca Co ₃ Magnesite – Mg Co ₃
1259)	Potassium is found in nature as carnalities, its composition is: (a) KAISi ₃ O ₄ (b) KClMgCl ₂ ·6H ₂ O (c) KCl (d) KCl. Al ₂ O ₃ ·2H ₂ O	B	
1260)	Fajan's rule states that small highly charged ions tend to form more:	C	



	(a) Ionic compounds (b) polymeric compounds (c) covalent compounds (d) Coordination compound	
1261)	Beryllium, a member of alkaline earth metal, is almost as hard as: (a) Calcium (b) Potassium (c) Iron (d) Magnesium	C
1262)	Beryllium, an alkaline earth metal resists towards complete oxidation because: (a) It is less reactive (b) The oxidation process is slow (c) It forms hard protective coat of BeO (d) None of the above	C
1263)	Reason for alkali metals to be soft is that: (a) They are less metallic in nature (b) There is only one valency (c) They do not have close packed structures (d) They have high I.E	C
1264)	Which oxide sodium metal predominantly forms in oxygen? (a) Na_2O (b) Na_2O_2 (c) Na_2O_3 (d) NaO_2	B
1265)	Select the correct statement; (a) All alkali metal hydroxides are stable to heat except LiOH (b) All alkali metal hydroxides are unstable to heat (c) All alkali metal hydroxides are stable to heat except CsOH (d) All alkali metal hydroxides are stable to heat	A
1266)	Refractory bricks used for furnace lining are formed by mixing and	A



	drying (a) MgO and clay (b) MgCO ₃ and clay (c) MgSO ₄ and clay (d) MgCO ₃ CaCO ₃		
1267)	Which one of the following is most ionic? (a) NaCl (b) MgCl ₂ (c) KCl (d) AlCl ₃	C	Charge on Cation & Cation sizes are directly proportional to Ionic character
1268)	Milk of magnesia is used for treatment of acidity in stomach, its formula is: (a) Mg(OH) ₂ (b) MgSO ₄ (c) Ca(OH) ₂ (d) CaSO ₄	A	
1269)	The electro negativity of [III]A element first decreases and then increases. This behavior is due to poor shielding of: (a) s – electron (b) p – electron (c) d – electron (d) f – electron	C	
1270)	Sodium tetra borate Na ₂ B ₄ O ₇ · 10H ₂ O is; (a) Colemanite (b) Borax (c) Diaspore (d) bauxite	B	Colemanite → Ca ₂ B ₆ O ₁₁ · 5H ₂ O * Diaspore → Al ₂ O ₃ · H ₂ O
1271)	The compound, Borax is used in borax bead test for the detection of cations. The molecular formula of compound is: (a) Ca ₂ B ₆ O ₁₁ · 5H ₂ O (b) H ₃ BO ₃ (c) Na ₂ B ₄ O ₇ · 10H ₂ O (d) (C ₂ H ₅) ₃ BO ₃	C	H ₃ BO ₃ → Boric Acid * (C ₂ H ₅) ₃ BO ₃ → Ethyl Borate
1272)	On strong heating orthoboric acid gives. (a) Meta boric acid (b) Tetra boric acid (c) Boric anhydride (d) None of the above	C	
1273)	Thermite process is:	A	



- (a) Exothermic
Endothermic
(c) Reversible
of the above
- (b)
(d) None

1274)	Sodium hydroxide acts on Aluminum oxide to form: (a) NaAlO_3 (c) NaAlO_2 (b) $\text{Na}_3\text{Al}_2\text{O}_6$ (d) NaAl_2O_3	D	
1275)	Molecular formula of silica is: (a) SiO_4 (c) SiO_2 (b) SiO_3 (d) Na_2SiO_3	C	
1276)	Sodium Carbonate when fused with sand forms sodium silicate which is commonly known as: (a) Soda glass (c) Jenna glass (b) water glass (d) pyrex glass	D	$\text{PbO} \rightarrow$ Flint Glass * Pyrex & Jena contain B_2O_3
1277)	Group 5 th elements arsenic and antimony are considered as: (a) Metallic (c) Metalloids (b) Non metallic (d) Transition elements	C	
1278)	Select the oxide which is in solid state at room temperature: (a) NO_2O_5 (c) NO_2 (b) N_2O (d) N_2O_3	A	
1279)	Ring test is shown by compounds having: (a) Sulphate radical (c) Nitrate radical (b) Chloride radical (d) None of the above	C	
1280)	Nitric oxide was passed through FeSO_4 solution a brown compound was formed as formula is: (a) FeSO_4NO (c) $\text{Fe}(\text{SO}_4)_2\text{NO}$ (b) $\text{FeSO}_4(\text{NO})_2$ (d) None of above	A	



1281)	Nitric oxide acts as / an: (a) oxidizing agent (b) reducing agent (c) both as reducing and oxidizing agent (d) neither oxidizing nor reducing agent	C	
1282)	In the action of HNO_3 on metals, the evolution of NO_2 is favored by; (a) Conc. HNO_3 (b) Dilute HNO_3 (c) Fuming HNO_3 (d) Very dilute HNO_3	A	
1283)	Phosphorus trihalides are readily hydrolysed as shown below: $\text{PX}_3 + 3\text{H}_2\text{O} \rightarrow \text{H}_3\text{PO}_3 + 3\text{HX}$ Generally moving from fluorine to iodine rate of hydrolysis: (a) Increases (b) Decreases (c) Remains unchanged (d) First increases and then decreases	A	
1284)	Phosphorus acid H_3PO_3 is highly soluble in water and behaves as: (a) Monobasic Acid (b) Dibasic acid (c) Tribasic acid (d) None of the above	B	
1285)	Which one of the following is not a commonly occurring sulphur compound? (a) H_2S (b) Ag_2S (c) SO_2 (d) SO_3	B	
1286)	In contact process for the manufacture of sulphuric acid, the impurity Arsenic is removed by freshly precipitated ferric hydroxide which absorb Arsenic oxide to	D	



	form: (a) Fe As O ₄ (b) Fe As ₂ O ₄ (c) Fe As ₃ O ₄ (d) FeAsO ₃		
1287)	The catalyst used in the contact process is easily poisoned by: (a) Nitrous oxide (b) carbon dioxide (c) Arsenic oxide (d) nitrogen oxide	C	
1288)	The compound used in borax bead test for the detection of basic radicals to form colored bead is: (a) H ₂ BO ₂ (b) (C ₂ H ₅) ₃ BO ₃ (c) Ca ₂ B ₆ O ₁₁ ·5H ₂ O (d) Na ₂ B ₄ O ₇ ·10H ₂ O	D	
1289)	Which one of the following does not exist? (a) HBO ₂ (b) HFO ₂ (c) H ₃ PO ₃ (d) HBrO ₂	B	
1290)	Select an element which exists in liquid state at room temperature. (a) Cl ₂ (b) F ₂ (c) Br ₂ (d) I ₂	C	* Cl ₂ , F ₂ → Gases I ₂ , As ₂ , → Solid.
1291)	Choose the inter halogen compound; (a) OF ₂ (b) BrF ₃ (c) HgBr ₃ (d) Hl	B	
1292)	In which of the following atoms, the 1s orbital is the smallest in size? (a) Bromine (b) Chlorine (c) Fluorine (d) Iodine	C	Down the group size of Halogen atom increases
1293)	Which one of the following does not have +7 oxidation; (a) F (b) Cl (c) Br (d) I	A	
1294)	3Ca (PO ₄) ₂ ·CaF ₂ is the formula of: (a) chlorapatite (b) fluorapatite (c) phosphorite (d) None of	B	



these

- 1295) The oxidation power of halogen depends upon:
(a) Energy of dissociation
(b) Electron affinity of atoms
(c) Hydration energies of ions
(d) All of the above
- 1296) Which of the following oxy acids of chlorine is least oxidizing in nature;
(a) HOCl (b) HClO_2
(c) HClO_3 (d) HClO_4
- 1297) Which one of the following is strongest acid?
(a) HClO_4 (b) HClO_3
(c) HClO_2 (d) HClO
- 1298) The oxide of chlorine, Cl_2O_2 in nature is:
(a) strongly basic (b) weakly basic
(c) **strongly acidic** (d) weakly acidic
- 1299) Which of the following is Hypochlorous acid?
(a) HClO (b) HClO_2
(c) HClO_3 (d) HClO_4
- 1300) The bleaching action of bleaching powder is due to "available chlorine" it is the amount of chlorine.
(a) that is required for the preparation of bleaching powder
(b) site free when excess of sulphuric acid is added to the bleaching powder.
(c) that is required for the generation of the hypochlorite
(d) Both B and C
- 1301) What is the trade name of tetrafluoroethylene polymer?
(a) Polystyrene (b) Bakelite
(c) Nylon (d) Teflon



1302)	Which one of the following is thermosetting polymer? (a) nylon-6, 6 (b) Poly ethylene (c) Bakelite (d) Teflon	D	
1303)	Teflon is prepared by the polymerization of; (a) butadiene (b) vinyl cynide (c) propylene (d) tetra fluoroethene	D	
1304)	Which of the following is not correct: (a)Xe is the most reactive among the rare gases. (b) He is an inert gas. (c)radon is obtained from decay of radium (d) the most abundant rare gas found in atmosphere is He.	D	
1305)	The formula of mustard gas is: (a) $(C_2H_2Cl_2)_2S$ (b) $(C_2H_4Cl_2)_2S$ (c) $(C_2H_3Cl_2)_2S$ (d) $(C_2H_4Cl)_2S$	D	
1306)	In which group all the elements donot belong to the same block and all the elements of valence electrons? (a) Zero group (b) First group (c) Third group (d) Seventh group	A	
1307)	Which of the following is not correct: (a)Xe is the most reactive among the rare gases. (b) He is an inert gas. (c)radon is obtained from decay of radium (d) the most abundant rare gas found in atmosphere is He.	D	He $\rightarrow$ 0.0005% * Ne $\rightarrow$ 0.0015% * Ar $\rightarrow$ 0.932%
1308)	Choose the correct name of Ba_2XeO_4 ; (a) Barium Xenate (b) Barium Xenthate (c) Barium Prexenate (d)	D	



	Barium Perxenthate		
1309)	In the periodic table period represents: (a) The number of electron in the outer most shell (b) The metallic and non metallic characters of the elements (c) The chemical properties of an element (d) The number of the shells in an element	D	
1310)	The order of reducing power of halide ion is: A) $I^- > Br^- > Cl^- > F^-$ B) $F^- > Cl^- > Br^- > I^-$ C) $I^- > Cl^- > F^- > Br^-$ D) $Br^- > Cl^- > I^- > F^-$	A	Eletronegativity is is inversely proportional to reduction power.
1311)	The first lionization energy of an atom depends on: A) Charge on nucleus B) Screening effect C) Electronic configuration D) All of the above	D	
1312)	Choose the correct order of decreasing basic strength: Reaction of water with magnesium is: (a) Slow (b) Fast (c) It is slow in the start and become fast at the end (d) It is slow in the start and become very slow at the end	D	
1313)	Al_2O_3 Reaction of water with magnesium is: (a) Slow (b) Fast (c) It is slow in the start and become fast at the end (d) It is slow in the start and become very slow at the end	D	
1314)	When chlorine water is added to KI solution the solution become (a) Pale yellow (b) Violent (c) Brown (d) Red	C	



- 1315)** Complementary colour of orange colour is:
(a) Red (b) Green
(c) Green blue (d) Yellow
- 1316)** XYZ are the elements in the same short period of the periodic table the oxide of X is amphoteric the Oxide of Y is basic and the Oxide of Z is acidic what is the order of increasing atomic number for these elements?
(a) XYZ (b) XZY
(c) YXZ (d) ZXY
- 1317)** Select the correct reaction of the following
(a) $\text{SnO} + 4\text{NaOH} \rightarrow \text{Sn}(\text{OH})_4 + 2\text{Na}_2\text{O}$
(b) $\text{SnO} + 4\text{NaOH} \rightarrow \text{Na}_4\text{Sn}(\text{OH})_4$
(c) $\text{SnO} + 2\text{NaOH} \rightarrow \text{Na}_2\text{Sn}(\text{OH})_4$
(d) None of the above
- 1318)** Lithium reacts with air to form:
(a) Li_2O (b) Li_2N
(c) $\text{Li}_2\text{O}_2 + \text{Li}_2\text{CO}_3$ (d) Both (a) & (b)
- 1319)** Molten NaCl conducts electricity due to the presence of
(A) Free electrons
(B) Free ions
(C) Free molecules
(D) Atoms of Na & Cl
- 1320)** Which of the following is more electropositive
(A) Li^+
(B) Ca^{++}
(C) Al^{+++}
(D) Cl^-
- 1321)** Which of the following has the smallest ionic radius?
(A) Mg^{2+}
(B) O_2^-
- Conductivity is either by free electrons or free ions. Molten NaCl has Na^+ and Cl^- ions due to which it conducts electricity.
- Reducing power $\propto$ electropositivity Cl^- is the strong reducing agent among the given species so it is more electropositive.
- Along the period from left to right atomic size decreases. Thus, ionic radius of Mg^{2+} is smaller than Na^+ , Mg^{2+} loses two electrons it ionic



- (C) Na^+
(D) F^-

radius is still smaller than O^{2-} and F^- anions are generally bigger in size than cations.

1322)	Electron affinity order is (A) $\text{I} < \text{F} < \text{Br} < \text{Cl}$ (B) $\text{I} < \text{Br} < \text{F} > \text{Cl}$ (C) $\text{I} < \text{Br} < \text{F} < \text{Cl}$ (D) $\text{I} < \text{Br} < \text{F} < \text{Cl}$	C	The electron affinity decreases down the group because of increase in size and decrease in nuclear attraction. The electron affinity of fluorine is lower than chlorine due to very small size and high charge density electrons repulsion occur which lowers its electron affinity.
1323)	Which one has no covalent radius? (A) P (B) S (C) Cl (D) Ar	D	Argon is a noble atom. its electronic configuration is complete thus it has no covalent radius because it cannot form covalent bond. It will have only Vander Wall's force between its atoms.
1324)	Which of the following fluorides has the highest lattice energy? (A) NaF (B) KF (C) CsF (D) LiF	D	Lattice energy $\propto \frac{1}{\text{size of cation}}$ Lattice energy $\propto$ Charge on cation
1325)	LiF is less soluble in water than KF. (A) LiF is more covalent than KF (B) LiF has higher lattice energy than KF (C) Li^+ ions are not extensively hydrated as K^+ (D) LiF has higher enthalpy of hydration than Kf	A	Due to high polarizing power of lithium it forms covalent compounds. Covalent compounds are less soluble compared to ionic compounds.
1326)	Table salt absorbs water because (A) It is mixed with KI (iodised salt) which is hygroscopic (B) It is contaminated with KCl which is hygroscopic (C) NaCl is hygroscopic in nature (D) It is contaminated with MgCl_2 which is hygroscopic	D	The salt contains impurities like CaCl_2 and MgCl_2 which are hygroscopic in nature which absorb humidity and water.
1327)	Which is paramagnetic?	A	Superoxide are paramagnetic because



- (A) KO_2 to anion contains odd number of electrons.
(B) Na_2O
(C) Na_2O_2
(D) H_2O

1328)	Oxides and hydroxides of group IA are	B	Oxides and hydroxides of IA are basic (alkaline) in nature. $\text{As Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{NaOH}$ $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$ both are basic in nature.
1329)	Which one of the following forms super oxides	D	Stability of super oxide increases down the group. After Na the rest of the elements of IA form super oxide. Na form super oxide with high oxygen supply. Na superoxide is less stable than superoxide of K, Rb, Cs. They form superoxide directly with oxygen.
1330)	The alkali metal that reacts with nitrogen directly to form nitride is	A	Only lithium can react directly to nitrogen to form Li_3N because of its high polarizing power as $3\text{Li} + \frac{1}{2}\text{N}_2 \rightarrow \text{Li}_3\text{N}$
1331)	The thermal stability of alkali metal metal chloride is in the order	B	As the size of cation increases down the group the thermal stability increases down the group. Also, the ionic characteristics is increasing more down the group and hence thermal stability increases.
1332)	Which of the following nitrates give NO_2 on heating?	D	Thermal stability increases down the group. Thus LiNO_3 decomposed completely on heating as $\text{LiNO}_3 \rightarrow \text{Li}_2\text{O} + \text{NO}_2 + \text{O}_2$
1333)	The flame colour of potassium metal or its compounds is	B	Metals are characterized by their specific colour of K is due to excitation of electrons to higher level



	(B) Violet (C) Golden yellow (D) Bright blue		and then de-excite which emit radiations in visible region, gives violet colour to it.
1334)	The violet flame shown by potassium in Bunsen flames is due to jumping of the electron from (A) 1s to 4p (B) 1s to 5p (C) 4p to 4s (D) 5p to 4s	C	For K the valence electronic configuration is $4s^1$. The electron from $4s^1$ is excited to empty 4p orbital. By de-excitation from 4p to 4s the energy released in the form of radiation in visible region impart violet colour.
1335)	The yellow flame shown by sodium in Bunsen form (A) 3p to 3s (B) 3p to 1s (C) 2p to 1s (D) 1s to 3p	A	The valence electronic configuration of Na is $3s^1$. The electron excited from $3s^1$ to empty 3p orbital after de-excitation energy is released in the form of radiation in visible region that impart yellow color to sodium.
1336)	The solubility of carbonates and sulphates of alkaline earth metals down the group ____ in water. (A) Increases (B) Decreases (C) Remains same (D) No regular trends	B	Due to decrease in charge density of IIA element cation down group solubility of sulphate and carbonate decrease. Down the group solubility of alkaline earth metals carbonate and sulphates decreases with decrease in hydration energy because on moving down the group their hydration energies decrease more rapidly than their lattice energy.
1337)	Na_2SO_4 is soluble in water but BaSO_4 is sparingly soluble because (A) The hydration energy of Na_2SO_4 is more than its lattice energy (B) The lattice energy of BaSO_4 is less than its hydration energy (C) The hydration energy of Na_2SO_4 is less than its lattice energy (D) The lattice energy of Na_2SO_4 is more than that of BaSO_4	A	When $\Delta H_h > \Delta H_{L,E}$ then ionic salt dissolves more and if $\Delta H_h < \Delta H_{L,E}$ then it dissolves less.
1338)	Which one is most stable (A) Ge^{+4} (B) Pb^{+4}	A	Because down the group in IVA inert pair effect dominates. +4 is stable in top members and +2 is stable in down



	(C) Sn^{+4}		members.
	(D) All have same stability		
1339)	Choose the correct order of stability	D	Because down the group (IVA) inert pair effect dominates. Down the group +2 oxidation state becoming more stable.
	(A) $\text{Ge}^{+2} < \text{Sn}^{+2} < \text{Pb}^{+2}$		
	(B) $\text{Sn}^{+2} < \text{Ge}^{+2} < \text{Pb}^{+2}$		
	(C) $\text{Pb}^{+2} > \text{Sn}^{+2} > \text{Ge}^{+2}$		
	(D) Both a and c		
1340)	Inert pair effect is dominant in	D	Inert pair effect dominating down the group. Down the group of IV the s valence electrons remain unionized or unshared.
	(A) C		
	(B) Si		
	(C) Sn		
	(D) Pb		
1341)	Water is the geometry of SiO_2 ?	A	SiO_2 has giant structure. The oxygen atom connect the two silicon atoms forming a giant structure. Each silicon is connected to four oxygen thus its geometry is tetrahedral.
	(A) Tetrahedral		
	(B) Octahedral		
	(C) Pyramid		
	(D) Angular		
1342)	Which one of the following has the maximum bond enthalpy?	D	In F – F fluorine has smallest size and contain 3 lone pair of electrons which repel one another in F – F. This makes its bond energy lower than Cl_2 . Cl – Cl has high bond enthalpy because it is a strong bond. It requires more energy to break it. Bond energy $\propto$ strength of bond. Bond energy $\propto \frac{1}{\text{bond length}}$
	(A) Br – Br		
	(B) F – F		
	(C) I – I		
	(D) Cl – Cl		
1343)	Which one of the following elements has the maximum electron affinity?	B	The electron affinity increases down the group but chlorine has higher electron affinity than fluorine because F is smallest in size and the electrons in the outermost shell of F are closer together and thus very small space in 2p orbital is available. Thus electrons affinity of F is lower than Cl.
	(A) F		
	(B) Cl		
	(C) Br		
	(D) I		
1344)	Which of the following bond is the strongest	C	Bond strength $\propto$ polarity. HF has high polarity so its bond will be stronger.
	(A) H – Cl		
	(B) H – Br		
	(C) H – F		
	(D) H – I		





- 1345)** Among the period iii which oxide A
can form strongly alkaline solution
(A) Na_2O
(B) MgO
(C) SO_3
(D) Cl_2O
 Na_2O form strongly alkaline solution when react with water. The metallic oxides forms alkaline solution this trends decrease from left to right in a period. MgO form weakly alkaline solution.
- 1346)** Which oxides have giant structure D
(A) Na_2O
(B) MgO
(C) Al_2O_3
(D) All
All these oxides have giant structure they do not exist in simple molecular structure.
- 1347)** When sodium react with air it forms D
(A) Monoxides
(B) Peroxide
(C) Superoxide
(D) Both a and b
In limited supply of oxygen it form monoxide
$$4\text{Na} + \text{O}_2 \xrightarrow[\text{of oxygen}]{\text{Limited Supply}} 2\text{Na}_2\text{O}$$

In excess of oxygen it forms peroxide
$$2\text{Na} + \text{O}_2 \rightarrow \text{Na}_2\text{O}_2$$
- 1348)** Which of the following is A
amphoteric?
(A) Al_2O_3
(B) SO_3
(C) Cl_2O_7
(D) P_4O_6
In period three the trend from basic oxides change into amphoteric and then acidic while going from left to right. Al_2O_3 is amphoteric oxides it can behave as an acid as well as a base.
- 1349)** Rubidium is found in the deposit of (b)
(a) Na (b) K
(c) Be (d) Mg
Small amounts of rubidium are found in potassium salts deposits.
- 1350)** Which is an essential constituent of (c)
chlorophyll
(a) Be (b) Fe
(c) Mg (d) Ca
Chlorophyll among other elements also contains Mg and it is available to the plants as Mg salts very very abundant in earth's crust.
- 1351)** Which of the following is lighter (a)
(a) Li (b) K
(c) Na (d) Ca
Density of Li is 0.53 g/cm^3 the lowest among alkali and alkaline earth metals.
- 1352)** LiOH _____ soluble than (b)
 NaOH
(a) More soluble
(b) Less soluble
(c) Equally soluble
(d) None
Li compounds with anions of high charge density like LiOH LiF etc. are generally less soluble in water than those of the other alkali metals.
- 1353)** Which of the following is the (a)
The melting point of Li is greater than



hardest metal among following

- (a) Li (b) Na
(c) Rb (d) K

that of Na, K and Rb, so Li is the hardest among these elements.

1354)	Which of the following form normal oxide? (a) K (b) Li (c) Na (d) None	(b) Only Li among the alkali metals, burns in air to form the normal oxide Li_2O . but since reactivity Na, K, Cs is greater than that of Li, that is why these elements form per and super oxides with air.
1355)	Which of the following compound is not possible? (a) $\text{NaC} = \text{CaNa}$ (b) $\text{KC} = \text{Ck}$ (c) $\text{LiC} = \text{CLi}$ (d) All	(a) As Li is less reactive than other alkali metals, therefore it does not react with acetylene. But Na, K react with acetylene to form their acetylides replacing H_2 gas.
1356)	Which of the following is possible (a) Na_3N (b) Be_3N (c) Li_3N (d) None of the above	(c) Li reacts with nitrogen to form nitride, while other members of this group do not form nitrides Li being small sized with greater charge density can be accommodated with N atom.
1357)	_____ reacts with alkalis to give hydrogen (a) Be (b) Mg (c) Ca (d) None	(a) $\text{Be} + 2\text{NaOH} \rightarrow \text{Na}_2\text{BeO}_2 + \text{H}_2$ Other members of group II_A are more electropositive than Be and have more basic character, so do not react with the base.
1358)	_____ gives peroxide (a) Be (b) Ba (c) Sr (d) be	(b) Ba upon heating with air or oxygen at $500 - 600^\circ\text{C}$ form its peroxide (BaO_2). other members of Gr II form normal oxides.
1359)	Which metal is least reactive (a) Be (b) Na (c) Mg (d) All	(a) Be is so much least reactive of gr II_A elements that it is stable in air at ordinary temperature.
1360)	_____ is used in breathing equipments for mountaineers and in space craft. (a) Li_2O (b) BeO (c) N_2 (d) KO_2	(d) KO_2 has the interesting use in breathing equipments mountaineers. It has the ability to absorb CO_2 while giving out oxygen.



1361)	Which oxide is more soluble in water? (a) BeO (b) MgO (c) CaO (d) BaO	(d)	The solubility of oxides of alkaline earth metals in water increases down the group. BeO, MgO are insoluble since water cannot break the lattices of BeO and MgO. BaO readily soluble forming Ba(OH) ₂ .
1362)	Which is not hygroscopic (a) NaOH (b) KOH (c) LiOH (d) None	(c)	The alkalimetal hydroxides all are crystalline solids, very soluble in water except LiOH. They are generally strong bases, hygroscopic except LiOH. H ₂ O is unable to break the crystal lattice of LiOH.
1363)	_____ is called milk of magnesia (a) NaOH (b) KOH (c) LiOH (d) None	(a)	Mg(OH) ₂ is sparingly soluble in water. A suspension of Mg(OH) ₂ in water is called milk of magnesia and it is used for treatment of acidity in stomach.
1364)	Which is not the mineral of alkali metals? (a) Salt petre (b) Dolomite (c) Natron (d) All	(b)	Dolomite is an important ore of Mg. Ca formula is MgCO ₃ . CaCO ₃ .
1365)	CaC ₂ on hydrolysis form (a) CH ₄ (b) C ₂ H ₄ (c) C ₂ H ₂ (d) C ₆ H ₆	(c)	$\text{CaC}_2 + 2\text{H} - \text{OH} \rightarrow \text{C}_2\text{H}_2 + \text{Ca(OH)}_2$
1366)	Which element has highest oxidation potential (a) Li (b) Be (c) Ba (d) Ra	(a)	The reduction potential of Li is -3.05v which is lowest. The oxidation potential of Li is +3.05v, the highest value oxidation and reduction potentials are of same magnitude with inverse signs.
1367)	The formula of washing soda is (a) Na ₂ CO ₃ . 7H ₂ O (b) Na ₂ CO ₃ . 8H ₂ O (c) Na ₂ CO ₃ . 10H ₂ O (d) Na ₂ CO ₃	(c)	At temperature below 35.2°C, Na ₂ CO ₃ crystallizes out from water as Na ₂ CO ₃ . 10H ₂ O, called washing soda. Above 35.2°C it crystallizes out as Na ₂ CO ₃ . H ₂ O.
1368)	Alkali metals act as (a) Reducing agent (b) Oxidizing agent	(a)	Alkali metals have tendency to lose electron and to be changed into positive ions. The electrons lost used



	(c) Bleaching agent (d) None		for reduction.
1369)	The color of flame of K is (a) Brick red (b) Apple green (c) Violet (d) Golden yellow	(c)	The radiations emitted by volatilizing K in Bunsen flame emit radiations which have their wavelength in violet region.
1370)	The chemical formula of Sylvite is (a) KCl (b) $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ (c) $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ (d) None	(a)	It is an important ore of K.
1371)	Na may act as (a) Oxidizing agent (b) Reducing agent (c) Both a and b (d) None	(b)	Na is an alkali metal. And alkali metals are strongly electropositive (tendency to lose electron), so reduce other substances.
1372)	In S-block elements generally the ionic size is (a) Increase (b) Decreased (c) Not affected (d) None	(a)	The trend in ionic radii is the same as that in atomic radii.
1373)	In alkaline earth metals, from top to bottom the heat of hydration is (a) Increases (b) Decreased (c) Not affected (d) None	(b)	The charge density decreases down the group. Therefore the attraction of ions and water is increased i.e. heat of hydration decreases.
1374)	Some of the elements of a period show similar behavior with the elements of next group in next period this is called (a) Vertical relationship (b) Oblique relationship (c) Diagonal relationship (d) none	(c)	Li of 2 nd period in I _A resembles with Mg of 3 rd period of group II _A , it is called diagonal relationship. e.g. LiOH and MgOH are less soluble in water.
1375)	The basic strength of solutions formed as a result of chemical reactions of I – A and II – A is (a) increased down the group (b) decreasing down the group	(a)	The basic character of alkali metal oxides increases down the group. CaO, SrO and BaO are soluble in water and react with water and their basic character increases down the



	(c) not affected (d) none	group. Be does not react with water and remaining alkaline earth metals produce hydroxides with water.
1376)	Which of the following elements has highest I.P. value? (a) K (b) Rb (c) Cs (d) Li	(d) Ionization potential values decrease down the group. Li is the top element has the highest I.P. of alkali metals.
1377)	When NaCl is dissolved in water the sodium ions are (a) Oxidized (b) Reduced (c) Hydrolyzed (d) Hydrated	(d) Na^+ ions move independently and are surrounded by H_2O molecules.
1378)	The chemical formula of Trona is (a) $\text{KCl} - \text{MgCl}_2 - 6\text{H}_2\text{O}$ (b) $\text{Na}_2\text{CO}_3 - 2\text{NaHCO}_3 - 2\text{H}_2\text{O}$ (c) $\text{Na}_2\text{CO}_3 - \text{H}_2\text{O}$ (d) KCl	(b) It is a mineral of sodium metal.
1379)	All alkaline earth metals except _____ are white in color (a) Be (b) Mg (c) Ca (d) None	(a) Be metal is a silvery grey in appearance.
1380)	Alkaline earth metals form _____ carbides when heated with carbon (a) Soluble (b) Insoluble (c) Unstable (d) Stable	(a) These react with water, e.g. CaC_2 reacts with water forming acetylene.
1381)	The alkaline earth metal carbonates, sulphates, phosphates are water _____ at room temperature (a) Soluble (b) Insoluble (c) Partially soluble (d) None	(b) Usually these compounds are insoluble with few exceptions e.g. BeSO_4 and MgSO_4 are soluble in water. Insolubility is due to the fact that water is not able to break the crystal lattice of the compounds e.g. of MgCO_3 , CaCO_3 are insoluble in water.
1382)	Due to the explosive nature the Na metal is stored in _____ (a) Alcohol (b) Hydrogen per	(d) Kerosene oil is an inert solvent and has no attraction for Na metal as Na has attraction for water or air.



	oxide (c) Sodium Hydroxide (d) Kerosene oil	
1383)	The M.P. of NaOH is _____ °C (a) 312 (b) 325 (c) 356 (d) 318	(d)
1384)	Calcium sulphate occurs in nature in Di hydrated form called (a) Soda ash (b) lime soda (c) Baking soda (d) Gypsum	(d) CaSO ₂ – 2H ₂ O is an important ore which is useful as a fertilizer for plants as well as in the industry.
1385)	At _____ °C gypsum losses its water molecules (a) 75 (b) 100 (c) 125 (d) 150	(c) At 100°C it loses its 3/4 H ₂ O molecules and converted to CaSO ₄ 1/2 H ₂ O called plaster of paris. But at 125°C it loses all of its water.
1386)	The formula of plaster of paris is (a) (CaSO ₄) – ½ H ₂ O (b) (CaSO ₄) – 5H ₂ O (c) (CaSO ₄) – 7H ₂ O (d) (CaSO ₄) – 9H ₂ O	(a) When gypsum heated to 100°C, then it loses 1 ½ H ₂ O molecules and changes to CaSO ₄ 1/2 H ₂ O called plaster of paris.
1387)	The heat of hydration _____ form top to bottom (a) increases (b) decreases (c) not affected (d) Remains same	(d) The charge density of ions of I _A , II _A elements decreases down the group. Therefore hydration of ions (attraction of h ₂ O for ions) is decreased as the charge density (charge/size ratio) decreases down the group
1388)	Li forms (a) Organ metallic compounds (b) Coordination compounds (c) Both a and b (d) None	(c) Li forms alkyl Li and Aryll which are more stable than those of other lkali metals Li also forms stable Li(NH ₃) ₄ complex.
1389)	Which has the largest electrical conductivity? (a) F ₂ (b) Cl ₂ (c) BR ₂ (d) I ₂	(d) I ₂ is a solid with metallic luster. With increase their area and more polarized. Therefore it has higher electrical conductivity than other halogens.



1390)	HF is (a) An oxidizing agent (b) A reducing agent (c) A weak acid (d) A strong acid	(c)	HF has greater bond energy and least ionized in water. Therefore it is a weakest acid.
1391)	Which has the highest I.P. value? (a) F (b) Cl (c) Br (d) I	(a)	Fluorine has highest ionization energy among the halogens I.I. of F = 1681 KJ/mole. Fluorine atom holds its electrons tightly. It is very much difficult to remove an electron from the small sized F-atoms.
1392)	The half life of _____ is 8.3 hrs (a) Cl (b) Br (c) I (d) None	(d)	F ₂ , Cl ₂ and Br ₂ are stable elements and not radioactive. But astatine is a radioactive and its most stable isotope has a half life of 8.3 hrs.
1393)	Inter molecular forces are stronger in (a) F (b) Cl (c) Br (d) I	(d)	With increase in the size of the atoms there is more distortion of electron cloud i.e. more polarization, the strength of Van der Waals forces is increased in iodine.
1394)	_____ elements exist as positive ions (a) Having lower values of E.N (b) Having high values of E.N. (c) Intermediate values of E.N. (d) All of above	(a)	Elements with the higher values of electronegativity usually exist as negative ions and those with lower values of electronegativity exist as positive ions since their ionization energies are also lower.
1395)	Fluoro compounds like CF ₄ show inertness due to (a) Restriction to octet for fluorine (b) Small size of fluorine (c) Low ionization energy of fluorine (d) None of above	(a)	Due to the restriction of valence shell of F-atom to an octet the Fluoro compounds show inertness e.g. CF ₄ and SF ₆ in these substances F remains restricted to -1 oxidation state.
1396)	_____ is the formula of fluorspar (a) Na ₃ AlF ₆ (b) CaF ₂ (c) CaF ₂ ·3Ca ₃ (PO ₄) ₂ (d) AlF ₃	(b)	It is an important mineral of Fluorine.
1397)	Oxidation state of _____ is always -1	(a)	The valence shell of F-atom is second shell which has maximum capacity to



- (a) F (b) Cl
(c) Br (d) I

accommodate 8 electrons. F-atom has 7 electrons in the valence shell, thus accommodates one more electron and has always oxidation state only -1.

1398)	_____ directly combines with noble gases (a) F (b) Cl (c) Br (d) None	(a)	F has direct combination with the noble gases. There is no such compound for noble gases with other halogens. Only Fluoro compounds of noble gases like XeF_2 , XeF_4 , XeF_6 etc. F combines due to its greater electronegativity.
1399)	The order of decreasing power of F, Cl, Br and I as an oxidizing agent is (a) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$ (b) $\text{Cl}_2 > \text{F}_2 > \text{Br}_2 > \text{I}_2$ (c) $\text{I}_2 > \text{Br}_2 > \text{Cl}_2 > \text{F}_2$ (d) $\text{Br}_2 > \text{I}_2 > \text{Cl}_2 > \text{F}_2$	(a)	Oxidizing power of F_2 is higher than other halogens because it has low energy of dissociation and higher standard reduction potential i.e. E_{red}^0 of F = +2.87. E_{red}^0 of Cl_2 = +1.36 and Br_2 and I_2 has further lower values.
1400)	Oxidizing power of halogens depends upon (a) Energy of dissociation (b) E.A of atoms (c) Hydration energies of ions (d) All of above	(d)	All these factors favour high oxidizing power of F_2
1401)	$\text{CaF}_2 - 3\text{Ca}_3(\text{PO}_4)_2$ is the chemical formula of (a) Apatite (b) Wavelike (c) Phosphorite (d) Cryolite	(a)	It is an important mineral of F as well as of Ca and P.
1402)	The fluorides of Sr are insoluble in water due to (a) Low M.P (b) Low B.P. (c) High lattice energy (d) all of the above	(c)	F forms ionic fluorides with Sr, Ba and these fluorides have higher lattice energies than their other halides, therefore these are insoluble in water.
1403)	Chlorine acts as _____ when it is used for bleaching (a) A dehydrating agent (b) A reducing agent (c) An oxidizing agent (d) None	(c)	Fluorine and chlorine can oxidize various coloured dyes, litmus and universal indicators and these substances are decolorized. Cl_2 acts as an oxidizing agent.



- 1404)** _____ gives slow and reversible reaction with hydrogen (d) Iodine reacts with H_2 gas at a higher temperature. The reaction of iodine with H_2 is very slow and reversible because the $H - I$ formed has low bond dissociation energy. Thus breaks at high temperature giving reversible reaction.
- (a) F (b) Cl
(c) Br (d) I
- 1405)** Which of the following has longest bond length (c) $H - I$ bond is the weaker bond due to least electronegativity difference between H and I and the size of iodine is greater. Therefore bond length of $H - I$ bond is longer than that of $H - Cl$, $H - Br$ and $H - F$ bonds.
- (a) HCl (b) HBr
(c) HI (d) HF
- 1406)** HF is _____ than water (c) Pure liquid HI is strongly hydrogen bonded and is a viscous liquid. But its viscosity is less than that of water due to absence of a three dimensional network of $H -$ bonds which are present in water. The $H -$ bonding in Hf makes a straight chain structure, due to which its viscosity is lower.
- (a) More viscous
(b) Equally viscous
(c) Less viscous
(d) None
- 1407)** Which one is strongest reducing agent (d) The strength of $H - I$ bond is weaker than that in $H - F$, $H - Cl$ and $H - Br$. Therefore $H - I$ dissociates and is oxidized to I_2 giving readily hydrogen for reduction of other substances.
- (a) HF (b) HBr
(c) HCl (d) HI
- $2HI + S \rightarrow I_2 + H_2S$
S is reduced by HI.
- 1408)** _____ occur naturally in a positive oxidation state (d) Iodine occurs naturally as $NaIO_3$, $NaIO_4$ deposits in chile brine wells. The oxidation state of I in these minerals is +5 and +7.
- (a) F (b) Cl
(c) Br (d) I
- 1409)** Which of the following is more acidic (d) In water hydrogen halides form hydrofluoric, hydrochloric, hydrobromic and hydroiodic acids. The ionization of HF is minimum, and of HI is maximum. So HF is a weak acid and HI the strongest acid.
- (a) HF (b) HCl
(c) HBr (d) HI



1410)	Dipole moment of HF is (a) 1.8 (b) 2.8 (c) 2.0 (d) 0.8	(a)	H – F is a strongly polar molecule due to the greater electronegativity difference of H and F. therefore H – F bond is partially ionic i.e. strongly polar. And its dipole moment is 1.8D as dipole moment measures the strength of polarity of molecule.
1411)	_____ is an anhydride of perchloric acid (a) Cl_2O (b) ClO_2 (c) Cl_2O_6 (d) Cl_2O_7	(d)	HClO_4 (perchloric acid) when treated with P_2O_5 at 10°C , is dehydrated to Cl_2O_7 . $2\text{HClO}_4 + \text{P}_2\text{O}_5 \rightarrow 2\text{HPO}_3 + \text{Cl}_2\text{O}_7$
1412)	ClO_2 is _____ in colour (a) Brown (b) Dark red (c) Pale yellow (d) Yellowish brown	(c)	ClO_2 is a paramagnetic substance i.e. unpaired electron present there, which gives colour.
1413)	In O_3F_2 the oxidation no of O is (a) -2 (b) +2/3 (c) -1/2 (d) +1	(b)	The oxidation number of 2F = -2. Therefore total oxidation number of 3O atoms - +2 oxidation number of 1 O-atom = +2/3
1414)	In Hesenlever method chlorine reacts with (a) OCI^{-1} (b) Ca (c) Ca(OH)_2 (d) None	(c)	$\text{Cl}_2 + \text{Ca(OH)}_2 \rightarrow \text{Ca(OCI)Cl} + \text{H}_2\text{O}$ (bleaching powder)
1415)	OCI^{-1} is known as _____ ion (a) Hypochtorus (b) Chlororite (c) Hpochlorite (d) Perchlorite	(c)	$\text{O}^{-1} \text{Cl}$ ion is anion of HOCl (Hypochlorous acid) which is named as Hypochlorite, similarly BrO^- , IO^- named as hypobromite and hypoiodite ions.
1416)	_____ is used to prepare unshrinkable wool (a) CaOCl_2 (b) HF (c) HCl (d) Ca(OH)_2	(a)	Bleaching powder (CaOCl_2) is also used to prepare unshrinkable wool.
1417)	_____ can exist as hexamer (a) HF (b) HCl (c) HBr (d) HI	(a)	Hydrogen bonding in HF molecules is also responsible for the association of HF molecules in the vapour phase. It has been observed that gaseous HF consists of an equilibrium mixture of



monomers and cyclic hexamers 6HF
 $(\text{HF})_6$

1418)	Which has high boiling point (a) He (b) Ne (c) Ar (d) Kr	(d)	The boiling points of noble gases increase down the group with increasing atomic number since polarizability increases with greater size.
1419)	Solubility of noble gases _____ down the group (a) Increases (b) Remains same (c) Decreased (d) None	(a)	Solubility of noble gases in water increases with increasing atomic number down the group because the bigger sized atoms are more readily polarized by water molecules.
1420)	_____ is used for prediction of earthquake. (a) Helium (b) Radon (c) Fluorine (d) Krypton	(b)	Radon being radioactive is used for earthquake prediction.
1421)	Formula of halite is (a) KCl (b) LiCl (c) CsCl (d) NaCl	(d)	It is a common mineral of chlorine and sodium.
1422)	Neon is _____ part of atmosphere (a) $1/50000^{\text{th}}$ (b) $1/65000^{\text{th}}$ (c) $1/60000^{\text{th}}$ (d) $1/55000^{\text{th}}$	(b)	Ne is present in atmosphere in a very little amount and is isolated from air during liquefaction of air.
1423)	Which one is the strongest acid (a) HClO (b) HClO_2 (c) HClO_3 (d) HClO_4	(d)	The acid strength increases with the increase in the number of oxygen atom. As the oxidation state of halogen increases the bonding electrons are shifted away from the H-atom.
1424)	Halogens do not react directly with (a) Carbon (b) Boron (c) Oxygen (d) Both a and b	(c)	The direct combination of halogens with oxygen is highly unstable. So for the formation of oxides of halogens some indirect methods are used. The reason is that all halogens act as oxidizing agents and convert other elements with positive oxidation state. Whereas oxygen itself is a strongly electronegative and does not



			acquire positive oxidation state easily.
1425)	Perchloric acid boils with (b) decomposition at (a) 60°C (b) 90°C (c) 30°C (d) 80°C		At 90°C it decomposes explosively. That is why it is stored and used as 67% solution in water.
1426)	What is the order of an increase in thermal stability of oxy acids of chlorine (a) $\text{HClO}_3 < \text{HClO}_4 < \text{HClO}_2 < \text{HClO}$ (b) $\text{HClO}_2 < \text{HClO}_3 < \text{HClO} < \text{HClO}_4$ (c) $\text{HClO} < \text{HClO}_2 < \text{HClO}_3 < \text{HClO}_4$ (d) $\text{HClO}_4 < \text{HClO}_3 < \text{HClO}_2 < \text{HClO}$	(c)	The increase in oxidation state of halogen from +1 to +7 causes an increase in the thermal stability of an acid. It means HClO is highly unstable and HClO_4 is most stable upon heating.
1427)	Which of the following is a decay product of the radium? (a) Ar (b) Xe (c) Rn (d) Ne	(c)	${}_{88}\text{Ra}^{226} \rightarrow {}_{88}\text{Rn}^{222} + {}_2\text{He}^4$. Radium is a radioactive element which decays to give random and α -rays.
1428)	_____ is used in high speed photography (a) He (b) Kr (c) Ne (d) Xe	(b)	Krypton is used to fill fluorescent tubes and in flash lamps for high speed photography.
1429)	All the elements of third period can be represented by the general electronic configuration a. $[\text{Ar}] \text{ ns np}$ b. $[\text{Kr}] \text{ ns np}$ c. $[\text{Ne}] \text{ ns np}$ d. $[\text{He}] \text{ ns np}$	(c)	
1430)	The atomic radius decreases up to chlorine progressively but at the end the radius of Ar increases. It is because? a. Ar has covalent radius b. Ar has metallic radius c. Ar has ionic radius d. Ar had Vander Waal's	(d)	

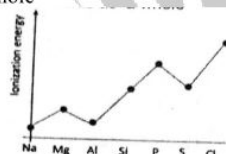


Radius

- 1431) In a period the atomic radius decreases from left to right. Because of
- Number of group increases
 - Number of elements increases
 - Nuclear charge increases
 - Non-metallic character increases

- 1432) X, Y and Z are three elements in the same period X is non-metal, Y is metal and Z is transition metal. Which one will be the correct order to place them in the same period from left to right
- XYZ
 - XZY
 - ZYX
 - YZX

- 1433) The given figure shows that the first ionization energy of the elements as a whole



- Increase
 - Decrease
 - Increase and decreases
 - Decreases and increases
- 1434) The 1st IE increases from Na to P. but in one case the trend become abnormal. This case is between
- Na and Mg
 - Mg and P
 - Al and Mg
 - Si and P

- 1435) The 1st I.E of S is less than P because of
- Greater Nuclear charge of S



- b. Greater Nuclear charge of P
- c. Stable electronic configuration of P
- d. Stable electronic configuration of S

- 1436)** P_4 , S_8 , Cl_2 and Ar are molecular elements of third period. All have Vander Waal's attraction among molecules. Which one has the highest M.pt and B.pt?
- a. P_4
 - b. S_8
 - c. Cl_2
 - d. Ar
- 1437)** Mg produces different products upon reaction with steam and cold water. MgO and H_2 gas are produced when reacted with.
- a. Cold water
 - b. Air
 - c. Steam
 - d. None of the above
- 1438)** $HClO_4$ is produced when is dissolved in water?
- a. Cl_2O
 - b. Cl_2O_7
 - c. $SOCl_2$
 - d. Both a and B
- 1439)** The following reaction undergoes when IA elements are reacted with $M^{+?} \rightarrow MOH + H_2$
- a. Oxygen
 - b. Hydrogen
 - c. Both O_2 and H_2 elements
 - d. Water
- 1440)** Which nitrate of the following will be strongly heated to decompose it?
- a. $NaHO_3$
 - b. KNO_3
 - c. $LiNO_3$
 - d. $CsNO_3$
- 1441)** The decomposition with temperature of carbonates, nitrates



and hydrogen carbonates increases down the group IA. This is because

- a. Polarizing power of the metal ion increase
- b. Polarizing power of the metal ion decreases
- c. The metal ion decrease in size
- d. Charge density on the metal ion increase.

1442)	Amphoteric oxide of metals acts as both as acid and base. Which one is it in given oxides? a. Na_2O b. Mg c. Al_2O_3 d. SO_3	c	
1443)	Which of the following is the electronics configuration of an alkaline earth metals of 3 rd period? a. $[\text{Ne}]3s^1$ b. $[\text{Ne}]3s^2$ c. $[\text{Ne}]3s^2 3p^1$ d. $[\text{Ne}] 3s^2 3p^1 3py^1$	b	
1444)	The solubility of Increases down the group of II a elements a. Carbonates b. Hydroxides c. Sulphates d. All of the above	b	
1445)	Which compound of calcium is less soluble in water? a. CaSO_4 b. CaCO_3 c. $\text{Ca}(\text{OH})_2$ d. None of the above	a	
1446)	_____ of IIA group elements are insoluble in water. a. Carbonates b. Sulphates c. Hydroxides d. Chlorides	a	



- 1447)** All are basic hydroxides except one b
a. $\text{Mg}(\text{OH})_2$
b. $\text{Be}(\text{OH})_2$
c. $\text{Ca}(\text{OH})_2$
d. None of the above
- 1448)** The mineral $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ has the a
general name
a. Gypsum
b. Dolomite
c. Calcite
d. Epsom salt
- 1449)** The dry ice is b
a. Solid ice without water
b. Solid CO_2
c. Solid SO_2
d. Solid C_6H_6
- 1450)** Which one is acidic in nature? b
a. Al_2O_3
b. CO_2
c. CO
d. CaO
- 1451)** third period element that initially b
reacts rapidly with oxygen to form
a protective oxide coating that
prevents further reaction is
a. Na
b. Al
c. Si
d. Mg
- 1452)** The yellow flame shown by sodium a
in Bunsen flame is due to excitation
of electron
a. 2p to 3s
b. 3p to 1s
c. 4p to 4s
d. 5p to 4s
- 1453)** Which of the following has greater k
affinity for oxygen?
a. B
b. Na
c. K
d. Mg
- 1454)** Transition elements are those D Transition elements are those in



	elements which have partially filled orbitals		which d or f orbitals are in the process of completion.					
	(A) P							
	(B) D							
	(C) F							
	(D) Both d and f							
1455)	All transition elements are solid except	B	Hg is found in liquid state					
	(A) Cu							
	(B) Hg							
	(C) Au							
	(D) Sc							
1456)	Which of the following chromium ion is strong reducing agent?	A	Cr^{+2} is strong reducing agent. It has more electrons than Cr^{+3} and Cr^{+6} it can oxidize easily as compared to Cr^{+3} and Cr^{+6} so it is a strong reducing agent. Power of reducing agent $\propto \frac{1}{+ve \text{ oxidation state}}$					
	(A) Cr^{+2}							
	(B) Cr^{+3}							
	(C) Cr^{+6}							
	(D) All are same							
1457)	Which acid is stronger out of the following?	A	$HMnO_4$ is the strongest acid. Central atom has +7 oxidation state.					
	(A) $HMnO_4$							
	(B) H_2CrO_4							
	(C) $H_2Cr_2O_7$							
	(D) H_2MnO_4							
1458)	Cu belongs to	A	Cu belongs to 3d series and its electronic configuration is $[Ar]4s^13d^{10}$					
	(A) 3d series							
	(B) 4d series							
	(C) 5d series							
	(D) 6d series							
1459)	Which of the following metal is non typical transition metal?	A	Transition elements are those which have partially filled d or f orbitals but in Zn the d orbital is fully filled (d^{10}) so it is non-typical transition element.					
	(A) Zn							
	(B) Cr							
	(C) Mn							
	(D) Ni							
1460)	Which of the following has the maximum number of unpaired electrons?	D	Fe^{+2} is d^6 system have 4 unpaired electrons. Valence shell electronic configuration of iron $[Ar] 4s^2 3d^6$ in Fe^{+2} is: <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1↓</td> <td>↑</td> <td>↑</td> <td>↑</td> <td>↑</td> </tr> </table>	1↓	↑	↑	↑	↑
1↓	↑	↑	↑	↑				
	(A) Ni^{2+}							
	(B) Ti^{3+}							
	(C) V^{3+}							



	(D) Fe^{2+}		
1461)	The ground state electronic configuration of chromium is (A) $[\text{Ar}]3d^5 4s^1$ (B) $[\text{Ar}]3d^5 4s^2$ (C) $[\text{Ar}]3d^6 4s^0$ (D) $[\text{Ar}]3d^5 5s^1$	A	Cr expected electronic configuration is $4s^2 3d^4$. But half-filled d-orbital is more stable than partially filled so one of the 4s electrons is shifted to 3d to make it half-filled stable orbital thus its electronic configuration will be $[\text{Ar}]3d^5 4s^1$
1462)	Transition metal compounds exhibit (A) Paramagnetic (B) Diamagnetism (C) Ferromagnetism (D) All of these	D	Transition elements exhibit the properties of paramagnetic, ferromagnetism and diamagnetism.
1463)	Magnetic moment of an atom or ion is the measure of its number of unpaired: (A) Electron (B) Proton (C) Neutron (D) Nucleons	A	Unpaired electrons cause attraction with magnet. Greater the unpaired electrons greater will be the magnetic moment. $u = \sqrt{n(n+2)}$, where n is the number of electrons.
1464)	The unit of magnetic moment is (A) Coulomb (B) Ampere (C) Bohr magneton (D) Watt	C	The Bohr magneton (μ_B) is a physical constant and natural unit for expressing magnetic moment due to magnetic field.
1465)	Some transition elements are paramagnetic due to (A) Paired electrons (B) Unpaired electrons (C) Inert pair (D) None of these	B	Paramagnetism $\propto$ unpaired electrons. Greater the number of unpaired electrons higher will be its paramagnetic behavior.
1466)	Which of the following is not ferromagnetic? (A) Ni (B) Co (C) Fe (D) Sb	D	Iron, cobalt, nickel and most of their alloys and some of rare earth metals are ferromagnetic.
1467)	Which of the following is diamagnetic? (A) Fe (B) Zn (C) Cu^{+3} (D) Cr	B	As Zn electronic configuration is $[\text{Ar}]4s^2 3d^{10}$ the d and s subshell is completely filled with no unpaired electrons. Thus it is diamagnetic.



1468)	What is coordination number of copper in $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$ (A) 2 (B) 6 (C) 4 (D) 5	C	The number of ligands attached to metal atom (central atom) is called co-ordination number. In $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$, For NH_3 is attached to Cu thus the co-ordination number is 4.
1469)	Transition metals form complexes very readily, the reason is (A) Smaller cations (B) Greater charge density of cations (C) Vacant d-orbitals (D) All of them	D	All are the requirements for complex formation by transition elements.
1470)	The IUPAC name of $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ is (A) Tetramminedichloro cobalt (I) chloride (B) Tetramminedichloro cobalt (III) Chloride (C) Dichloro tetrammine cobalt (II) chloride (D) Dichloro tetrammine cobalt (III) chloride	D	According to rule of IUPAC the name of $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ is given as Dichlorotetra-ammine cobalt (III) chloride
1471)	Which of the following is not a bidentate ligand: (A) $\text{C}_2\text{O}_4^{2-}$ (B) En (C) SCN (D) Glycinate Ion	C	Glycinate ion, $\text{C}_2\text{O}_4^{2-}$ and en are bidentate while SCN^- is an ambidentate ligand.
1472)	The number of d electrons of Cr in $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ ion is (A) 2 (B) 3 (C) 4 (D) 5	B	Cr^{+3} is present in $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ ion thus Cr^{+3} is $4s^0$ is $3d^3$. Three unpaired electrons are present in $3d^3$.
1473)	Which of the following is a chelating ligand? (A) H_2O (B) NH_3 (C) Pyridine (D) $\text{C}_2\text{O}_4^{2-}$	A	Oxalate ion is a chelating agent because it is a bidentate ligand.
1474)	The coordination number of Cu in bis ethylenediamine copper(ii)	B	$[\text{Cu}(\text{en})_2]\text{Cl}_2$ in this complex Cu is attached to 2 en but the en is



	chloride is (A) 2 (B) 4 (C) 6 (D) 8		bidentate ligands thus the co-ordination number of Cu is 4.
1475)	Which one is chromic compound? (A) CrCl_3 (B) $\text{Cr}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$ (C) CrCl_2 (D) Both a and b	D	Compounds in which Cr is in +3 oxidation state is called chromic compound oxidation states are Cr oxidation state in $\text{CrCl}_3 = +3$ Cr oxidation state in $\text{Cr}(\text{SO}_4)_4 \cdot 18\text{H}_2\text{O} = +3$ Cr oxidation state in $\text{CrCl}_2 = +2$
1476)	The number of 3d electrons in Fe^{+2} is (A) 6 (B) 5 (C) 2 (D) 4	A	Valence electronic configuration of Iron. $3d^6 4s^2$. in case of Fe^{+2} the 2 "s" electron is lost only 6 electrons are present in 3d.
1477)	Consider the following equilibrium: $2\text{CrO}_4^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) = \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{H}_2\text{O}(\text{l})$ Color of CrO_4^{2-} is yellow and that of $\text{Cr}_2\text{O}_7^{2-}$ is orange. By adding acid to this equilibrium color of this solution will become (A) Orange (B) Yellow (C) Colorless (D) Blue	A	As $2\text{CrO}_4^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) = \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{H}_2\text{O}(\text{l})$ Yellow orange By adding acid, the H^+ concentration on left side increase equilibrium shift to the right thus more $\text{Cr}_2\text{O}_7^{2+}$ is produced and the color of the solution becomes orange.
1478)	Which of the following alcohol can't be oxidized by $\text{K}_2\text{Cr}_2\text{O}_7$? (A) Primary alcohol (B) Secondary alcohol (C) Tertiary alcohol (D) All of these	C	Due to absence of hydrogen in tertiary carbon, it cannot be oxidized by $\text{K}_2\text{Cr}_2\text{O}_7$
1479)	Potassium dichromate acts as a strong (A) Oxidizing agent (B) Reducing agent (C) Bleaching agent (D) Dehydrating agent	A	In $\text{K}_2\text{Cr}_2\text{O}_7$ the Cr is present in +6 oxidation state thus potassium dichromate acts as a strong oxidizing agent. Positive oxidation state $\propto$ oxidizing power.
1480)	The oxidation state of Cr in CrO_2Cl_2 is:	D	As O = -2, Cl = -1, Cr = x Thus in CrO_2Cl_2



	(A) 2 (B) 3 (C) 4 (D) 6		$X - 2(2) - 1(2) = 0 \Rightarrow x - 4 - 2 = 0$ $\Rightarrow x = 6$
1481)	Transition elements form alloy because of (A) Similarity in their sizes (B) Differences in their sizes (C) Belong to same series (D) Variable oxidation state	A	Some transition elements are able to replace one another in the metallic lattice and form substitutional alloy among themselves. This is due to similarity in their sizes.
1482)	Which of the following oxides of chromium is amphoteric in nature? (A) CrO (B) CrO ₃ (C) Cr ₂ O ₃ (D) None	C	In Cr ₂ O ₃ the Cr is in +3 oxidation state and Cr ⁺³ is either oxidize to Cr ⁺⁶ or reduce to Cr ⁺² . Thus, Cr ₂ O ₃ is Amphatic in nature.
1483)	Which of the following is correct regarding oxidizing power? (A) CrO ₃ > Cr ₂ O ₃ > CrO (B) CrO > Cr ₂ O ₃ > CrO ₃ (C) Cr ₂ O ₃ > CrO ₃ > CrO (D) CrO ₃ > CrO > Cr ₂ O ₃	A	Oxidizing power is directly proportional to positive charge on transition metal. Thus Cr ⁺⁶ > Cr ⁺³ > Cr ⁺² and the trend of the chromium oxide is CrO ₃ > Cr ₂ O ₃ > CrO
1484)	CHAPTER 14 D AND F -BLOCK ELEMENTS		
1485)	In movies during fight a blood red solution is using as an artificial blood. Which of the following complex ion is used for this solution? A. [Fe(H ₂ O) ₆] ²⁺ B. [Cu(NH ₃) ₄ (H ₂ O) ₂] ⁺² C. [Fe (SCN) (H ₂ O) ₅] ⁺² D. Fe(H ₂ O) ₆	C	
1486)	Coordination number six complex having d ² sp ³ hybridization exist in: A. Tetrahedral shape	D	



	B. Square planar shape C. Trigonal bipyramidal shape D. Octahedral shape	
1487)	Arrange the following oxide of chromium in increasing acidic character: A. $\text{CrO} > \text{Cr}_2\text{O}_3 > \text{CrO}_3$ B. $\text{CrO}_3 > \text{Cr}_2\text{O}_3 > \text{CrO}$ C. $\text{Cr}_2\text{O}_3 > \text{CrO} > \text{CrO}_3$ D. $\text{CrO}_3 > \text{CrO} > \text{Cr}_2\text{O}_3$	B
1488)	Many hexaaqua complex ions can undergo reaction with water as given below $[\text{Fe}(\text{H}_2\text{O})_6]^{+2} \text{aq} + \text{H}_2\text{O} \rightleftharpoons [\text{Fe}(\text{H}_2\text{O})_5\text{OH}]^+ \text{H}_3\text{O}^+$ The reaction is classed as: A.Redox reaction B. Acid base reaction C.Decomposition reaction D.Substitution reaction	C
1489)	Consider the following reactions. i. $\text{C}_2\text{H}_2(\text{g}) + \text{H}_2(\text{g}) \rightleftharpoons \text{C}_2\text{H}_6(\text{g})$ ii. $\text{N}_2(\text{g}) + 3\text{H}_2 \rightarrow 2\text{NH}_3(\text{g})$ Choose the catalysts employed for the reaction. A. Ni for both reactions (i) and (ii) B. Fe.Or for both the reactions (i) and (ii) C. Ni for the reaction (i) and Fe_2O_3 for (ii) D. Fe_2O_3 for the reaction (i) and Ni (ii)	C
1490)	Most solutions containing ferric ions are usually yellow or yellowish brown. This is due to the formation of A. $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ B. $[\text{Fe}(\text{H}_2\text{O})_5(\text{OH})]^{2+}$ C. $[\text{Fe}(\text{H}_2\text{O})_4(\text{OH})_2]^+$ D. $[\text{Fe}(\text{H}_2\text{O})_3(\text{OH})_3]^0$	B
1491)	Compounds of vanadium exists in the following oxidation states; 5+, 4+, 3+, 2+, The compounds in	B



the 3+ and 2+ oxidation states
behave as

- A. Good oxidizing agent B. Good
reducing agent
C. Weak oxidizing agent D. Weak
reducing agent

1492)	Choose the correct name of the compound $K(PtCl_6)$; A. Potassium hexachloro platinum B. Potassium hexachloroplatinate C. Potassium hexachloroplatinate D. Potassium chloroplatinate	D	
1493)	Reaction between peroxodisulphate ions and iodide ions is given below, $S_2O_8^{2-} + 2I^- \rightarrow 2SO_4^{2-} + I_2$. Choose the suitable catalyst, A. Ni^{+2} B. Fe^{2+} & Fe^{3+} C. Fe^{3+} D. Fe^{2+}	B	
1494)	The following dynamic equilibrium exists between CrO_4^{2-} and $Cr_2O_7^{2-}$ ions in solution. $CrO_4^{2-} \rightleftharpoons Cr_2O_7^{2-}$ The equilibrium is sensitive to acids and bases.. Choose the correct statement, if NaOH is added to the system under equilibrium; A. Equilibrium shifts to the right B. $Cr_2O_7^{2-}$ is decomposed to Cr_2O_3 C. Equilibrium remains unaffected D) Equilibrium shifts to the left	D	
1495)	Which of the following electronic configuration is/are correct? i. $Cu_{29}[Ar]4s^1 3d^{10}$ ii. $Ti_{22}[Ar]4s^2 4d^2$ iii. $Fe_{26}[Ar]4s^1 3d^5 4p^1$ A) i only B) i & ii only C) ii, iii only D) i and iii only	B	
1496)	The compound of Cr (Chromium) with a strong reducing power is; A) $K_2Cr_2O_7$ B) $CrCl_3$ C) Cr_2O_3 D) None of the	B	



	above			
1497)	The electronic configuration of titanium is $1s^2 2s^2 2p^6 4s^2 3d^2$; A) K_2TiO_4 B) K_3TiF_6 C) $TiCl_3$ D) TiO			
1498)	Choose the reagent used to test the presence of Fe ions in solution with the formation of intense red colour A) $NaSCN$ B) $KSCN$ C) NH_4CNS D) All of the above	D		
1499)	The chelating ligand out of the following ; A) CH_3COO^- B) $(CH_2)_2(NH_2)_2$ C) SCN^- D) NO_2^-	B		
1500)	The outer electronic configuration of Cu^+ Ion is $4s^0 3d^{10}$ with this configuration the aqueous solution of copper (I) compound is: A) Blue B) Greenish blue C) Bluish green D) Colourless.	D		
1501)	Which of the following is NOT a member of transition metal? (a) Scandium family (b) Iron family (c) Titanium family (d) Beryllium family	D		
1502)	Which one of following electronic sub-shells the lanthanides have in the process of filling? (a) 4f (b) 5f (c) 4d (d) 5d	A	Actinides $\rightarrow 5f$	
1503)	Elements not found in nature synthesized in nuclear reactions and involving completion of 51 orbital are known as. (a) Lanthanides (b) Transition elements (c) Rate gases (d) Actinides	D	Block	Contents
			D	Transition elements (outer) 3d-series, 4d-series & 5d series
			F	Actinides & lanthanides 4f series and 5g-series (Inner



transition elements)

- 1504)** Choose the correct electronic configuration for Scandium ($Z=21$): **B**
- (a) $2s^2 2s^2 2p^6 3s^2 3p^6 3d^1 4s^1$
(b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^1 4s^2$
(c) $1s^2 2s^2 2p^5 3s^2 3p^6 3d^1 4s^8$
(d) $1s^2 2s^2 2p^5 3s^2 3p^6 4s^2 4p^1$
- 1505)** What is the right configuration of an element with 24 electrons. **D**
- (a) $1s^2 2s^2 2p^6 3p^6 3d^6$
(b) $1s^2 2s^2 3s^2 2p^6 3p^6 4s^2 3d^4$
(c) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
(d) $1s^2 2s^2 2p^6 3s^2 4s^1 3d^5$
- 1506)** The correct electronic configuration of Nickel (28) is: **A**
- (a) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
(b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2 4p^1$
(c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2 4p^2$
(d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1 4p^3$
- 1507)** The electronic configuration of Cu(29) is: **A**
- (a) $3s^2 3p^6 3d^{10} 4s^1$ (b) $3s^2 3p^6 3d^9 4s^2$
(c) $3s^2 3p^6 3d^8 4s^2$ (d) $3s^2 3p^6 3d^9 4s^2$
- 1508)** The highest oxidation state of Manganese $3s^2 3p^6 3d^5 4s^2$ in its compounds is: **c**
- a) +2 (b) +5
(c) +7 (d) +8
- 1509)** Cobalt metal generally forms colored compounds. The color is due to: **B**
- (a) d.d electronic transition which falls in the visible range
(b) p.p electronic transition which falls in the visible range
(c) d.v electronic transition which



falls in the visible range.
(d) d.p electron transition which falls in the visible range.

1510)	The color of coordination compound is dimethylglyoximenickel(II) is: (a) Red (b) Blue (c) Orange (d) Black	B
1511)	The oxidation number of cobalt in $[\text{Co}(\text{en})_2\text{H}_2\text{O}(\text{CN})]^{2+}$ is: (a) 2 (b) 3 (c) 4 (d) 5	B
1512)	Ammonium hydroxide was added to a salt solution deep blue color was obtained. The solution contains ions of: (a) Zn^{+2} (b) Cu^{+2} (c) Fe^{+3} (d) Ba^{+2}	B
1513)	Which of the following is not transition element; (a) Zn (b) Cr (c) Mn (d) Ni	A
1514)	The oxidation number of iron in $(\text{Fe}(\text{CN})_6)^{-4}$ is: (a) + 3 (b) + 2 (c) + 4 (d) + 6	B
1515)	Complexes with bidentate ligands are called; (a) Ligands (b) Chelates (c) Complexes (d) None of the above	B
1516)	16. $[\text{NiCl}_4]^{-2}$ is tetrahedral shaped complex, the bond angle $\angle \text{Cl-Ni-Cl}$ is; (a) 120° (b) 107° (c) 105° (d) 109°	D
1517)	17. Choose the correct geometry of the coordination compound $[\text{Ni}(\text{CN})_4]^{-2}$ [2013-160 Eng]:	A



- (a) Square planer (b) Tetrahedral
(c) Trigonalbipyramidal (d)
Octahedral

1518)	18. Choose the compound tetra amine aqua Chlorocobalt(III) chloride: (a) $[Co(NH_3)_4(H_2O)(Cl_2^-)]Cl_3^-$ (b) $[Co^{+2}(NH_3)_4(H_2O)(Cl_2^-)]Cl_3^-$ (c) $[Co(NH_3)_4(H_2O)(Cl_2^-)]Cl_3^-$ (d) $[Co(NH_3)_4(H_2O)Cl]Cl_2$	D	
1519)	Which is good quality iron are containing low phosphorus content? (a) Hematite (b) Limonite (c) Siderite (d) Magnetite	D	
1520)	Which one is considered as fool's gold? (a) Copper metal (b) Iron pyrites FeS_2 (c) Copper glance Cu_2S (d) None	B	
1521)	Which of the following furnaces is used for the production of wrought iron? (a) Open hearth furnace (b) Reverberatory furnace (c) Bessemer converter (d) Blast furnace	B	
1522)	Which one of the following is not a physical property; (a) Corrosion (b) Solubility (c) Melting point (d) Boiling point	A	
1523)	Cons: H_2SO_4 is added to mixture of $K_2Cr_2O_7$ and metal chloride is solid scale. Brown vapors are formed] which one is correct formula? (a) $CrOCl_2$ (b) $COCl_2$	C	

(c) CrO_2Cl_2 (d) $CrCl_6$

1524)	The formula of potassium manganate is; (a) $KMnO_4$ (b) K_2MnO_4 (c) K_3MnO_4 (d) K_2MnO_3	B	
1525)	The element which has the smallest atomic radius is: (a) Fe (b) Co (c) Ni (d) Cu	c	
1526)	Ethylene diaminetetraacetate ion (EDTA) is a polydentate ligand it bonds to central metal atom through: (a) Two of its atoms (b) Three of its atoms (c) Four of its atoms (d) Six of its atoms	D	
1527)	The coordination number of cobalt in the complex $[Co(H_2NCH_2CH_2NH_2)_3]^{+3}$ is: (a) 3 (b) 4 (c) 5 (d) 6	D	The number of co-ordinate covalent bonds for MED] is called co-ordination number. Ethylenediamine is bidentate, so 6 bonds are for MED] by it..
1528)	Identify the name of coordination compound $K_4[Fe(CN)_6]$: (a) Potassium hexacyanoferrate (b) Potassium hexacyanoferrate (II) (c) Potassium hexacyanoferrate (III) (d) Potassium (I) hexacyanoferrate (IV)	B	
1529)	Which of the following titrants would most likely be used as this own indicator in acid medium? (a) $K_2Cr_2O_7$ (b) Iodine (c) $KMnO_4$ (d) H_2O_2	C	
1530)	Chromium compounds in which oxidation state is 6+ behaves as: A) Strong oxidizing agent	a	Stable oxidation state of Chromium is +3... Below this it act as reducing agent and above it as oxidizing



	B) Strong reducing agent C) Very weak oxidizing agent D) Very weak reducing agent		agent.
1531)	Select the correct formula of chlorpenta-aqua-chromium (iii) chloride. A) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_3$ B) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$ C) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}_2]\text{Cl}$ D) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}_3]\text{Cl}$	b	
1532)	The components of bronze alloy are: A) Copper and zinc B) Copper and tin C) Zinc and tin D) Chromium and Tin	B	
1533)	Select ligand which is bidentate and can form chelates. A) CH_3NH_2 B) PH_3 C) H_2O D) $\text{NH}_2-\text{CH}_2-\text{CH}_2-\text{NH}_2$	D	A ligand which can donate two pairs is bidentate. Ethylenediamine is bidentate because it has two donatable pairs on two nitrogen atoms.
1534)	Choose the correct name of the compound given below: $\text{Ag}^+ \text{C} \equiv \text{C}^- \text{Ag}^+$ (a) Silver carbide (b) Alkynide (c) Silver dicarbide (d) None of the above	B	
1535)	The compound BaCu_3O_3 consists of: (a) Cu(I) and Cu(II) Cations (b) Cu(II) and Cu(III) Cations (c) Cu (III) and Cu(IV) Cations (d) Cu(II) and Cu(IV) Cations	B	
1536)	The colours of MnO_4^{-1} and Mn^{2+} solution in water are respectively: (a) Intense dark purple colour and colourless (b) Light purple colour and colourless (c) Intense dark purple colour and brown colour	A	



(d) $\text{CHCl}_2\text{COOH} \gg \text{CH}_2\text{COOH} > \text{CH}_2\text{Cl}$



	(c) CaCl_2	(d) MgCO_3	
1541)	When small amount of ammonia is added to CuSO_4 solution in water, blue ppt of $[\text{Cu}(\text{H}_2\text{O})_4(\text{OH})_2]$ is formed. The blue ppt dissolves on addition of excess of ammonia. The product formed is:		B
	(a) $[\text{Cu}(\text{H}_2\text{O})_2(\text{NH}_3)_2(\text{OH})_2]$		
	(b) $[\text{Cu}(\text{NH}_3)_4(\text{OH})_2]$		
	(c) $[\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$		
	(d) $[\text{Cu}(\text{NH}_3)_3(\text{H}_2\text{O})]^{2+}$		
1542)	What is the formula of Dichloro-Bis-ethylenediamine cobalt (II)?		A
	(a) $[\text{Co}(\text{en})_2\text{Cl}_2]^{2-}$		
	(b) $[\text{Co}(\text{en})_2\text{Cl}_2]^{2-}$		
	(c) $[\text{Co}(\text{en})_2\text{Cl}_2]^{1-}$		
	(d) $[\text{Co}(\text{en})_2\text{Cl}_2]^{1+}$		
1543)	Which is not a transition element?		(a) Ca is in II_A group which is a s-block element and does not contain incomplete d or f-subshell in its valence shell.
	(a) Ca		
	(b) Cu		
	(c) Cr		
	(d) Co		
1544)	The magnetic moment is denoted by		(c) $U = \sqrt{n(n+2)}$ where n is the number of unpaired electrons in the transition metal ion. The unit of u is Bohr magneton.
	(a) R		
	(b) M		
	(c) u		
	(d) None		
1545)	$\text{CuSO}_4 - 5\text{H}_2\text{O}$ is used to prepare		(a) In $\text{CaSO}_4 - 5\text{H}_2\text{O}$ the four H_2O molecules are associated with Cu^{++} cation. These H_2O molecules act as ligand and form a complex.
	(a) Transition complex		
	(b) Fehling's 'A' sol.		
	(c) Fehling's 'B' sol.		
	(d) Fehling's sol		
1546)	Which is not a bidentate ligand		(d) All are bidentate ligands since their coordination with the central transition metal occurs through their both negatively charged oxygen atoms.
	(a) $\text{C}_2\text{O}_4^{2-}$		
	(b) CO_3^{2-}		
	(c) SO_4^{2-}		
	(d) none		
1547)	Elements which have partially filled d or f-orbital in their commonly occurring oxidation states are called		9d) It is definition of transition element that it should have partially filled d or f-subshell. Zn (II_B) has completely filled subshell, therefore it is called
	(a) D-block elements		



- (b) F-block elements
(c) Both a and b
(d) Transition elements

non typical transition element.

1548)	Zn, Cd and Hf are (a) D-block elements (b) F-block elements (c) Both a and b (d) None	(a)	These have their complete filled d-subshells. E.g. $_{30}\text{Zn}$ has $3d^{10}$ subshell.
1549)	Which are found abundantly in nature (a) 3d-series (b) 4d-series (c) 5d-series (d) 4f-series	9a)	3d-series elements Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn occur abundantly in nature in the form of their minerals.
1550)	Ionic and covalent compounds of T.E. are mostly (a) Colored (b) Colorless (c) Ionic colored while covalent colorless (d) Ionic colorless while covalent colored	(a)	All simple transition metal ions contain unpaired electrons and are coloured. The colour of the ions depends upon the electronic transition between the available d-orbitals. Transition metals also form coloured covalent compounds in their high oxidation state e.g. KMnO_4 is purple.
1551)	many transition metals and their compounds are (a) Diamagnetic (b) Paramagnetic (c) Neither a nor b (d) None	(b)	Transition metals and their compounds have a certain number of unpaired d-orbitals. As the number of unpaired electrons increases the paramagnetic character increases.
1552)	The electron pair donor which react with transition metal ions to form complex compounds are called (a) Electrophile (b) Nucleophile (c) Ligands (d) None	(c)	The atom ions or neutral molecules, which surround the central metal ion and donate electron pairs to it, are called ligands e.g. CN^- , NH_3 , $\text{C}_2\text{O}_4^{2-}$ etc. are ligands.
1553)	Electronic configuration of Cu^{+2} is (a) $4s^2, 3d^9$ (b) $4s^{-1}, 3d^{10}$ (c) $4s^0, 3d^9$ (d) None of these	(c)	Cu atom has configuration $4s^1 3d^{10}$ but when it loses two electrons then it acquires $4s^0 3d^9$
1554)	Negative ligands end with	(a)	Anionic ligands are named by using



	_____ in naming complex ion		suffix 'O'
	(a) 'O' (b) 'ium'		
	(c) 'ate' (d) 'ide'		
1555)	Which is in different phase from other metals?	(b)	Hg is found in liquid form also.
	(a) Ni (b) Hf		
	(c) Cd (d) Na		
1556)	The d-block elements usually give _____ absorption bands	(b)	The colour of transition metal compounds is due to the absorption spectra of transition metal complexes. These absorb energy for excitation of electron from lower d-orbital to higher d-orbitals. e.g. $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$ ion absorbs yellow radiations from white light emitting bluer and red, hence looks violet.
	(a) Narrow (b) Broad		
	(c) Normal (d) None		
1557)	In open hearth process dolomite is used if the impurities are	(c)	Dolomite lining of the open hearth furnace is done to remove acidic impurities like P and S from cast iron in the manufacture of steel.
	(a) Mn, Si (b) C, Si		
	(c) P, S (d) None		
1558)	This reaction is called $\text{Fe}^{+2} + \text{Zn} \rightarrow \text{Zn}^{+2} + \text{Fe}$	(c)	If a protective layer of Zn over iron is damaged, a galvanic cell formed in which Fe serves as cathode and Zn acts as anode, as a result Zn decays and Fe remains intact.
	(a) Weathering		
	(b) Immersed corrosion		
	(c) Sacrificial corrosion		
	(d) Cathode coating		
1559)	The %age of C is different types of soft iron products is in the order of	(c)	Wrought iron is the purest form of iron and contains least % of carbon while cast iron (Pig iron) contain maximum % of carbon.
	(a) Cast iron > wrought iron > steel		
	(b) Wrought iron > steel > cast iron		
	(c) Cast iron > steel > wrought iron		
	(d) Cast iron = steel > wrought iron		
1560)	The variable oxidation states of	bc	



transition elements is due the involvement of

- a. (n-1)d electrons
- b. Ns electrons
- c. Both b and s electrons
- d. 'Nd and np electrons

1561) The lanthanide series follow Lanthanum. This series is included in _____ period.

- a. 3rd
- b. 4th
- c. 6th
- d. 7th

1562) 3rd transition series belong to which period of the periodic table?

- a. 3rd
- b. 4th
- c. 5th
- d. 6th

1563) Which is the correct electron onfiguration is of Cr Z = 24?

- a. [Ar] 3d⁴ 4s²
- b. [Ar] 3d⁵ 4s¹
- c. [Ar] 3d⁶ 4s⁰
- d. [Ar] 3d⁴ 4s⁰

1564) The paramagnetic nature of a substance depends upon

- a. The number of electrons in the outermost orbit
- b. The number of electron that are easily ejected
- c. The number of unpaired electrons
- d. The number of long pair of electrons

1565) With increase in number of unpaired electrons, para magnetism

- a. Increases
- b. Decreases
- c. Remains constant
- d. Decreases then increases

1566) Select the element which is not ferromagnetic



- a. Fe
- b. Co
- c. Sb
- d. Ni

1567) The diamagnetic substance are
a. Weakly repelled by a strong magnetic field
b. Strongly repelled by a weak magnetic field
c. Strongly repelled by a weak magnetic field
d. Repelled by an all magnetic field

d

1568) Fe, Co, Ni, Show +2 most stable oxidation state because
a. Increasing nuclear charge push s electrons for bonding
b. Increasing nuclear charge pulls d electrons from bonding
c. Their EN decreases
d. The given statement is False.

b

1569) The color of transition metals complexes is due to
a. D-d transition of electrons
b. Paramagnetic nature of transition elements
c. Ionization
d. Loss of s-electron

a

1570) Transition metals form complexes due to
a. Large ionic charge
b. Small cation size
c. Vacant d-orbitals
d. All of the above

c

1571) Formation of colored solution is possible when metal ion in the compound contains
a. Paired electrons
b. Unpaired electrons
c. Lone pair of electrons
d. None of these

b

1572) Brass is an alloy of

a



- a. Cu and Zn
- b. Fe and Ni
- c. Cu and Cr
- d. Cu and Ag

1573) A complex compound in which the oxidation number of a metal is zero is

- a. $K_4[Fe(CN)_6]$
- b. $K_3[Fe(CN)_6]$
- c. $[Ni(CO)_4]$
- d. $[Pt(NH_3)_4]Cl_2$

1574) Ethylenediamine is an example of

- a. Neutral ligand
- b. Bidentate ligand
- c. Poly dentate ligand
- d. Monodentate ligand

1575) The coordination number of Cu in $[Cu(CI)_2(en)_2]^+$ is

- a. 3
- b. 4
- c. 6
- d. 9

1576) Which one is formula of tetraamminechloronitroplatinum (IV) sulphate?

- a. $[Pt(NH_3)_4(NO_2)]SO_4$
- b. $[PtNO_2Cl_2(NH_3)_4]SO_4$
- c. $[PtCl(NO_2)_2(NH_3)]SO_4$
- d. $[Pt(NH_3)_4(NO_2)Cl]SO_4$

1577) The IUPAC name of $[Co(NH_3)_5ONO]^{2+}$ ion is

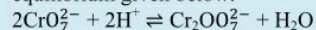
- a. Pentaamminenitro cobalt (III) ion
- b. Pentaamminenitro cobalt (IV) ion
- c. Pentaamminenitrito cobalt (IV) ion
- d. Pentaamminenitrito cobalt (III) ion

1578) K_2CrO_4 (potassium chromate) when dissolved in water from a yellow solution and $K_2Cr_2O_7$ (potassium dichromate) produces an orange



solution. These colours comes from negative ions CrO_4^{2-} respectively.

In solution the ions are in equilibrium given below.



Yellow orange

This dynamic equilibrium is sensitive to acidity and basicity.

- a. Addition of acid increases orange colour
- b. Addition of base increases the orange colour
- c. Addition of Acid increases the yellow colour
- d. None of the above

1579) Mn [Ar] $3d^5 4s^2$, Exist in +7, +6, +5, +4, +3, +2 Oxidation states. The stable oxidation state is +2, This is due to

- a. Greater Number of unpaired es
- b. Strong Paramagnetism
- c. Good catalytic property
- d. Half-filled d-orbital

1580) KMnO_4 acidified is used for d oxidation of alkenes to glycols, During this reaction the purple colour of solution changes to

- a. Dark green
- b. Dark brown
- c. Blue
- d. Colourless

1581) The most pure from of iron is d

- a. Caste iron
- b. Steel
- c. Pig iron
- d. Wrought iron

1582) The richest ore of iron is a

- a. Magnetite
- b. Hematite
- c. Siderite
- d. Iron pyrites

1583) Potassium dichromate acts as a a



strong

- a. Oxidizing agent
- b. Reducing agent
- c. Bleaching agent
- d. Dehydrating agent

1584)

CHAPTER 15:

ORGANIC COMPOUNDS

1585)

To differentiate between white ppt of AgCl and off-white ppt of AgBr we use;
a) Dil solution of NaOH
b) Dil solution of $\text{Pb}(\text{NO}_3)_2$
c) Dil solution of NH_3 d) Dil solution of FeCl_3

C

1586)

All the compounds are inorganic EXCEPT:
(a) CaCO_3 (b) CaC_2
(c) KCN (d) $(\text{NH}_2)\text{CO}$

D

1587)

All compounds are organic except;
(a) $(\text{H}_2\text{N})_2\text{CO}$ (b) NH_4CNO
(c) CH_3NO_2 (d) $\text{C}_2\text{H}_5\text{N}_2\text{HSO}_4$

B

1588)

When coal is heated ($500-1000^\circ\text{C}$) in the absence of air the process is called;
(a) Distillation (b) Carbonization
(c) Cracking (d) Reforming

B

1589)

Quality of fuel is judged from its octane number the best fuels are;

B

- (a) straight chain hydrocarbons
- (b) branched chain hydrocarbons
- (c) cyclic compounds
- (d) aromatic compounds

1590)

Octane number one hundred is given to compound:

A



	(a) 2,2,4-Trimethylpentane (b) n-heptane (c) n-octane (d) Iso heptane	
1591)	Tetracthyl lead (C_2H_5) ₄ Pb is used as antiknock agent and is abandoned because of its hazardous product during the combustion of fuel. The hazardous product is: (a) CO ₂ (b) CO (c) Lead (d) Free radical ethyc (C_2H_2)	C
1592)	In reforming process open chain hydrocarbons are converted into: (a) Polymers (b) branch chain hydrocarbon (c) Ring hydrocarbons (d) Branch & Ring hydrocarbon	D
1593)	Cracking problem of fuel combustion can be avoided by: (a) Reforming (b) Improving octane number (c) Adding TEL (d) All of the above	D
1594)	We used pb(C_2H_5) ₄ in the gasoline to reduce: (a) Consumption of fuel (b) Price of fuel (c) Octane number of fuel (d) Knocking of Engine	D
1595)	When n-heptane is heated in the absence of air at high temperature in the presence of catalyst, it changes to 2,2,4triethyle pentane. This process is called (a) Cracking (b) Reforming (c) Polymerisation (d) Condensation	b
1596)	Which o the following is cycloalkane; (a) C ₆ H ₁₄ (b) C ₆ H ₁₂	B



	(c) C_6H_{10} (d) C_6H_8		
1597)	Esters are represented by the general formula; (a) ROP (b) BOOR (c) RCOOR (d) RCOOH	C	
1598)	Which isomers have difference in both their physical and chemical properties? (a) Chain isomers (b) Position isomers (c) Functional group isomers (d) Both A) and (B)	C	Chain and position isomerism can exist in the same compound but functional group isomerism exists in different compounds having different physical and chemical properties.
1599)	The isomerism exhibits by C_3H_7OH is: (a) Position isomerism (b) Functional group isomerism (c) Chain isomerism (d) All of the above	D	
1600)	Which is an isomer of ethanol? (a) CH_3OH (b) $C_2H_5OCH_3$ (c) CH_3OCH_3 (d) $C_2H_5OC_2H_5$	C	
1601)	Dimethyl ether and ethanol is an example of: (a) Chain isomerism (b) position isomerism (c) Metamerism (d) Functional group isomerism	D	
1602)	An organic compound having molecular formula C_2H_6O can exhibit functional group isomerism. Select the correct isomers: (a) Methanol and methoxy methane (b) Ethanol and ethoxy ethane (c) Ethanol and methoxy methane (d) Methanol and ethoxy ethane	C	



1603)	How many isomers are possible for pentane? (a) 2 (b) 3 (c) 4 (d) 5	B	
1604)	Which isomerism is not shown by alkene; (a) Metamerism (b) Chain isomerism (c) Position isomerism (d) Geometrical Isomerism	A	
1605)	Which type of isomerism is being exhibited by $FCH=CHF$? (a) Chain isomerism (b) Structural isomerism (c) Geometrical isomerism (d) Position isomerism	C	
1606)	Why is the boiling point of n-Pentane about 28°C higher than that of its 2,2-Dimethylpropane isomer? (a) The area of contact between 2,2-Dimethylpropane is small which results in weak forces of attraction. (b) 2,2-dimethylpropane molecules repel each other (c) N-pentane molecules cannot come into closer contact with each other (d) Shapes of molecules have not effect on boiling point	A	
1607)	Which of the following structure has a bond for Med by an overlay of Sp^2 hybrid orbital with that of SP hybrid orbital? (a) $HC=CH$ (b) $H_2C=CH_2$ (c) $H_2C=C=CH_2$ (d) $CH_2=CHCH_3$	C	
1608)	The bond angle between H - C - C bond in ethane is: (a) 109.5 (b) 120 (c) 90 (d) 107.5	A	
1609)	25 Ethanol (CH_3CH_2OH) and	A	



dimethyl ether (CH_3OCH_3) are the best considered as:

- (a) Structural isomers b) Stereo isomers
c) Enantiomers d) Diastereomers

1610)	Which of the following compound is assigned the octane number of 100? a) n-heptane b) n-octane c) 2,3,3-trimethyl pentane d) 2,2,4-trimethyl pentane	D	
1611)	Diethyl ether and Methyl propyl ether are: a) Conformational isomers b) Metamers c) Geometrical isomers d) Enantiomers	B	
1612)	A tertiary carbon is bonded directly to: a) 2 Hydrogens b) 2 Carbons c) 3 Carbons d) 4 Carbons	C	
1613)	Conc. HCl is added to a metal salt and then subjected to flame test on platinum wire. It Imparts crimson color to the flame. Which metal salt it is? A) Sodium B) Potassium C) Strontium D) Calcium	C	
1614)	Carbon monoxide can be converted by hydrogenolysis to alkanes by the process known as: (a) Contact process (b) Fischer-tropsch (FT) process (c) Fermentation process (d) Haber-Bosch process	B	
1615)	The self linking property of carbon is called as (a) Linking polymerization	(c)	There are millions of organic compounds known at present. Large number of compounds is due to the unique property of carbon that it



	(b) Addition (c) Catenation (d) Elimination	forms long chains and rings with other carbon atoms. This self linkage is called catenation.
1616)	To which carbon is not multiply bonded in organic compounds (a) Nitrogen (b) Sulphur (c) Oxygen (d) Hydrogen	(d) Hydrogen forms always single bond with other atoms.
1617)	Most of the organic compounds are _____ in nature (a) Polar (b) Non-polar (c) Ionic (d) All of them	(b) Mostly organic compounds are non-polar because these are hydrocarbons with which C – C and C – H bonds are non polar.
1618)	Similarity in properties of different organic compounds give rise to the under standing of _____ (a) Polymerization (b) Non-polar nature (c) Homologous series (d) Isomerism	(c) A homologous series is a group of organic compounds or a family which contains the same functional group. Thus these have similar properties.
1619)	Which of the following complex? (a) Glucose (b) $(C_6H_{10}O_5)_n$ (c) Fructose (d) Sugar	(b) Glucose, fructose are simple molecules, while sugar is a molecule formed by condensation of glucose with fructose $(C_6H_{10}O_5)_n$ is a complex molecule.
1620)	Organic compounds generally react at _____ rates. (a) Slow (b) Fast (c) Moderate (d) None of them	(a) Organic compounds are generally covalent compounds the reaction of covalent compounds are slow reactions.
1621)	Organic compounds are generally soluble in _____ solvents (a) Polar (b) Non-polar (c) Partially polar (d) None of them	(b) Most organic compounds insoluble in water and dissolve readily in non polar organic solvents.
1622)	Which is not an organic compound? (a) Rubber (b) paper (c) Dyes (d) None of them	(d) Paper, rubber and dyes all are organic compounds.



1623)	Which is not a fossil fuel (a) Petroleum (b) Coal (c) Natural gas (d) None of them	(d)	Petroleum, coal and natural gas are obtained by the chemical and biochemical decomposition of living matter.
1624)	Due to the bacterial action on wood it is converted into (a) Peat (b) Lignite (c) Bituminous coal (d) Anthracite	(a)	Due to bacterial and chemical reactions on wood it got converted into peat.
1625)	Which is a mixture of low boiling hydrocarbon (a) Natural gas (b) Petroleum (c) Coal (d) Wood	(a)	Natural gas is a mixture of low boiling hydrocarbons. It is a mixture of methane, ethane, propane and butane, but the major portion of it is methane. (b.pt. -164°C)
1626)	Natural gas in Pakistan is used as (a) Automobile fuel (b) Industrial fuel (c) Domestic fuel (d) All of them	(d)	In Pakistan natural gas being cheaper is used for power generation, as a fuel in general industries and for domestic purposes.
1627)	Petroleum in its refined form is also called as (a) Mineral Oil (b) Mineral gas (c) Mineral Solid (d) Mineral liquid	(a)	When petroleum is refined in the refineries it is called mineral oil. But initially when it is extracted from rocks called crude oil.
1628)	Petroleum when extracted as blackish substance is called as (a) Crude oil (b) Crude solid (c) mineral oil (d) Mineral gas	(a)	Petroleum when extracted from earth rocks it appears like a liquid of blackish colour known as crude oil. It is refined to get different fractions.
1629)	Fractional distillation of petroleum gives gasoline (a) 10% (b) 20% (c) 30% (d) 40%	(b)	Complex liquid mixture of hydrocarbons containing mainly $\text{C}_5 - \text{C}_{10}$ is nearly about 15 – 30% of mineral oil obtained by its fractional distillation.
1630)	Cracking normally gives smaller molecules (a) Alkanes (b) Alkenes	(d)	During cracking process the C – C and C – H bonds in long chain alkane molecules are broken, producing smaller molecules of both alkanes and



	(c) Alkynes (d) Both a and b	alkenes.
1631)	Cracking done with heat at high temperature is called (a) Thermal (b) Catalytic (c) Steam (d) None of them	(a) It is useful in the production of unsaturated hydrocarbons such as ethene and propene.
1632)	Cracking done at low pressure and with a catalyst is called _____ (a) Thermal (b) Catalytic (c) Steam (d) None of them	(b) The cracking of higher hydrocarbons at lower temperature (500°C) and lower pressure (2 atm) in presence of $\text{SiO}_2 + \text{Al}_2\text{O}_3$ catalyst produce gasoline of higher octane number.
1633)	The by product of cracking can be (a) Ethen (b) Butene (c) Benzene (d) All of them	(d) Besides increasing the yield of gasoline cracking has also produced large amount of by product such as ethene, butene, propene and benzene.
1634)	The gasoline with high octane No. has _____ (a) more knocking (b) Less knocking (c) No knocking (d) Only knocking	(b) The quality of gasoline is indicated by its octane number. As the octane number increases, the engine is likely to produce less knocking.
1635)	The gasoline having octane No. 100 has _____ (a) more knocking (b) Less knocking (c) No knocking (d) Only knocking	(c) If iso-octane or 2,2,4 Trimethyl petane is supplied to the engine, then engine works smoothly without knocking.
1636)	Which is a knocking inhibitor (a) TEL (b) CH_4 (c) C_2H_5 (d) C_6H_6	(a) The octane number of poor fuel can be improved by blending it with a small amount of tetraethyl lead (TEL), which is an efficient anti knock agent.
1637)	The open chain compounds are also called (a) Aliphatic (b) Alicyclic (c) Aromatic (d) Both a and b	(a) The open chain organic compounds are acyclic or called aliphatic.
1638)	Closed chain compounds can be classified into	(d) The compounds which contain closed chain or rings of atoms are known as cyclic or ring compounds. These are



	(a) Homocyclic (b) Hetrocyclic (c) Aliphatic(d) Both a and b	homocyclic or carbocyclic (ring is made up of only C-atoms) and heterocyclic compounds (ring contains carbon atoms and hetro atoms)
1639)	Those compound which have any atom other than C as member of rings are called as (a) Monocyclic (b) Hetrocyclic (c) Aliphatic(b) Both a and b	(b) The cyclic compounds in which ring consists of more than one kind of atoms, called heterocyclic. Usually ring contains mostly C-atoms and one or two hetro atoms like N, O, S etc.
1640)	Hetrocyclic compounds are also called as (a) Carbocyclies (b) Hetrocycles (c) Hetroatom (d) None of them	(b) When a ring consists of atoms of more than one kind are called heterocycles.
1641)	The atom other than C in a hetrocyclic compound is called as (a) Hetroatom (b) Hetroion (c) hetro molecule (d) Hetroelement	(b) When a ring consists of atoms of nmore than one kind of called heterocycles.
1642)	The active part in molecule is called (a) Hetroatom (b) Functional group (c) Chemical bond (d) Ion	(a) In hetero cyclic compounds generally one or more atoms of elements such as nitrogen (N) oxygen (O) or Sulphur (S) are present. The atoms other than carbon in the ring are called hetero atom.
1643)	Alkanes normally have _____ hydridization (a) Sp (b) Sp^2 (c) SP^3 (d) $d\ sp^3$	(b) An atom or group of atoms or a double bond or a triple bond whose presence imparts specific properties to the molecule is called functional group. Which is the active part of molecule.
1644)	Alkenes normally have _____ hydridization (a) Sp (b) Sp^2 (c) SP^3 (d) $d\ sp^3$	(c) In alkanes the C-atom is bonded to four other atoms, the if needs 4 equivalent orbitals for bond making. This is why 4 sp^3 hybird orbitals of carbon are used for bonding.
1645)	Alkynes normally have _____	(b) In alkenes the doubly bonded carbons



hybridization

- (a) sp (b) sp^2
(c) sp^3 (d) $d\ sp^3$

are bonded to three other atoms. Therefore these carbons required three equivalent orbitals for bonding. That is why these C-atoms utilize three sp^2 hybrid orbitals.

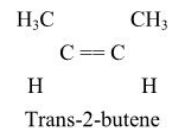
1646)	n-butane and iso butane are an example of (a) Chain isomerism (b) Positional isomerism (c) Meta merism (d) Functional group isomerism	(a)	Normaly chain isomerism is present in alkanes.
1647)	1-butene an 2-butene are an example of (a) Chain isomerism (b) Positional isomerism (c) Metamerism (d) Functional group isomerism	(b)	The position of double bond changes i.e. in 1-butene double bond is between 1 and 2 carbons and in 2 buten the double bond is between 2 and 3 carbons.
1648)	Dimethyl ether and ethyl alcohol are an example of (a) Chain isomerism (b) Positional isomerism (c) Metal merism (d) Functional group isomerism	(d)	$CH_3 - O - CH_3$ and $CH_3 - CH_2 - OH$ have their molecular formula C_2H_6O , but different functional groups. In ether it is $C - O - C$ group and in alcohol it is OH group.
1649)	Diethyl ketone methyl n-propyl ketone are an example of (a) Cain isomerism (b) Positional isomerism (c) Metal merism (d) Functional group isomerism	(c)	Both compounds belong to same family but differ due to unequal distribution of carbon atoms on either side of the functional group. $\begin{array}{ccc} O & & O \\ & & \\ C_2H_5 - C - C_2H_5 & \text{and} & CH_3 - C \\ & & \\ & & CH_2 - CH_2 - CH_3 \end{array}$
1650)	If similar groups are attached on one side it is called (a) Cis-form (b) Trans-form (c) Tautomeric form (d) None of them	9a)	In geometric isomers the position of identical group sis only on one side, it is called Cis-form like $\begin{array}{ccc} H_3C & & CH_3 \\ & C = C & \\ H & & H \end{array}$ Cis-2-butene
1651)	If dissimilar groups are attached on	(b)	In geometric isomers the two



one side it is called

- (a) Cis – form (b) Trans-form
(c) Tautomeric form (d) None of them

dissimilar groups are on the opposite sides of the double bonded C-atoms of the molecule called trans-isomer



1652)	For geometric isomerism the two groups attached the same carbon atom must be (a) Similar (b) Dissimilar (c) May be a or b (d) None of them	(b) The necessary and sufficient condition for a compound to exhibit geometric isomerism is that the two groups attached to the same carbon must be different. E.g. there is no geometric isomerism for $\text{H}_3\text{C} - \text{CH} = \text{C} - \text{CH}_3$ CH_3 (2-methyl-2-butene)
1653)	Single bond _____ rotate (a) Can (b) Cannot (c) Can never (d) None of them	(a) The C-atoms joined by a single bond are capable of free rotation about it and therefore such molecules do not show geometric isomerism.
1654)	Cracking done with $\text{H}_2\text{O}(\text{g})$ and heating and cooling, is called _____ cracking (a) Thermal (b) Catalytic (c) Steam (d) None of these	(c) Higher hydrocarbon vapours when mixed with steam, heated for short time to about 900°C and then cooled rapidly. This process is suitable for obtaining lower unsaturated hydrocarbons.
1655)	According to Vital Force Theory, D organic compound can only be synthesized by (A) Animals (B) Plants (C) Rocks (D) Both a & b	According to Vital Force Theory organic compounds can only be obtained from living source (plants + animals)
1656)	Which one is an organic D compound? (A) KCN (B) NH_4OCN (C) CS_2 (D) None of these	They are all inorganic compounds. They lack properties of organic compounds.



- 1657)** The process of heating coal in the absence of air is called D
(A) Fractional distillation
(B) Vacuum distillation
(C) Steam distillation
(D) Destructive distillation
The separation of an organic compound by heating in the absence of air is called destructive distillation.
- 1658)** Which one of the following is high quality coal? D
(A) Bituminous
(B) Sub-Bituminous
(C) Lignite
(D) Anthracite
Due to the presence of high percentage of carbon anthracite is a high-quality coal.
- 1659)** Valency of carbon is highly unsaturated D
(A) Ethane
(B) Ethylene
(C) Acetylene
(D) Benzene
In benzene, the valency of carbon is highly unsaturated because resonance occurs in them while in ethane, ethylene and acetylene no resonance occurs.
- 1660)** Petroleum, natural gas and coal are most probably formed by the long time decay of C
(A) Radioactive matter
(B) Mineral matter
(C) Organic matter
(D) All of these
Long time decay of organic matter under high temperature, pressure, bacterial and chemical activity it forms petrol, natural gas and coal.
- 1661)** Organic compounds are used as D
(A) Food
(B) Clothing
(C) Shelter
(D) All of them
Most of the organic compounds are used as food like starch, carbohydrates, proteins. The clothes that we wear are also organic in nature and plastic leather are used as shelter.
- 1662)** Which one of the following is called black gold? A
(A) Coal
(B) Petroleum
(C) Natural gas
(D) All of these
Coal is also called black gold, while petrol is called liquid gold and natural gas is called clean fuel.
- 1663)** What is the next homologue of C_4H_{10} ? A
(A) C_5H_{12}
(B) C_6H_{14}
(C) C_3H_8
(D) C_2H_6
The next homologue is differed by CH_2 group so if the first homologue is C_4H_{10} then next homologue is C_5H_{12}



- 1664)** In homologous series number is C
different from its neighbor by ____ group.
(A) CH_3
(B) C_2H_5
(C) CH_2
(D) C_2H_4
Each member differs by $-\text{CH}_2$ group as C_2H_6 and C_3H_8 is differ from one another by $-\text{CH}_2$. They are homologous of each other.
- 1665)** Acyclic organic compounds have C
(A) Cyclic structure
(B) One cycle in structure
(C) Straight or branched
(D) Both a & b
Open chain organic compounds which may have straight chain or branched chain are called acyclic organic compounds.
- 1666)** Which statement is correct for D
Lassaigne solution.
(A) In Lassaigne solution nitrogen is present as NaCN
(B) In this solution sulphur is present as Na_2S
(C) In this solution halogen is present as NaX
(D) All of them
Nitrogen, sulphur and halogens are present in the Lassaigne's solution NaCH , Na_2S and NaX respectively.
$$\text{Na} + \text{C} + \text{N} \rightarrow \text{NaCN}$$
$$2\text{Na} + \text{S} \rightarrow \text{Na}_2\text{S}$$
$$\text{Na} + \text{X} \rightarrow \text{NaX}$$
- 1667)** Which element is not detected in C
organic compounds?
(A) Carbon
(B) Hydrogen
(C) Oxygen
(D) Nitrogen
Oxygen cannot be detected by any direct method but can be detected by indirect method.
- 1668)** The modern definition of organic a
chemistry is based on
a. Composition of the organic compounds
b. Origin of the organic compounds
c. Structure of the organic compounds
d. Physical properties of the organic compounds
- 1669)** The precise definition of organic c
chemistry is
a. Study of Carbon containing compounds
b. Study of Hydrocarbons
c. Study of hydrocarbons and



their derivatives
d. Study of combustible compounds

1670) In organic compounds C atoms c bond together to form chains and rings. This property of carbon is called

- a. Substitution
- b. Elimination
- c. Catenation
- d. Combustion

1671) Our daily used products are mainly c organic. We use water, natural gas, polish, edible salt, drugs, cement, paints, papers and food. Which of the following are all organic compounds?

- a. Water, natural gas, drugs,
- b. Salt, papers, paints
- c. Drugs, paints, polish
- d. Cement, water, edible salt

1672) Which of the following organic b compounds are obtained from living organisms?

- a. Methane
- b. Vitamins
- c. Benzene
- d. Asphalt

1673) Largest number of organic b compounds are found in

- a. Natural gas
- b. Coal
- c. Petroleum
- d. All of the above

1674) "It is formed due to the decay of b marine animals and vegetables organism (plants). These were buried underground in the interior of earth they found high temperature and pressure for years. The substance thus produced gradually moved, through the porous rocks under great pressure,



and then it reached those areas under the earth where it was surrounded by non-porous rocks. Here it was collected as large reservoirs." This is the theoretical statement for the origin of

- a. Coal
- b. Petroleum
- c. Natural gas
- d. All of the above

1675) The type of coal containing high a moisture content is

- a. Lignite
- b. Anthracite
- c. Bituminous
- d. Sub bituminous

1676) Most of the compounds obtained b from plants are of

- a. Industrial value
- b. Medicinal value
- c. Fuels
- d. All of the above

1677) An organic compounds is a synthesized from a none-living source using the basic components needed for the called

- a. Total synthesis
- b. Inorganic synthesis
- c. Partial synthesis
- d. William sons synthesis

1678) Beer and milk products are products c of

- a. Natural product chemistry
- b. Inorganic chemistry
- c. Biotechnology
- d. Fossil fuels

1679) The most productive distillate of d coal is

- a. Ammonic al liquor
- b. Coal gas
- c. Coke
- d. Coal tar

1680) In Fischer-Tropsch process the b



distillate of coal converted to petroleum is

- a. Coke
- b. Coal gas
- c. Coal tar
- d. All of the above

1681) In Bucky balls the smallest c molecule known contains ----- carbon atoms

- a. 60
- b. 15
- c. 20
- d. 70

1682) All elements given below can be d detected is an organic compound without using Lassaigne's solution except

- a. Carbon
- b. Hydrogen
- c. Oxygen
- d. Nitrogen

1683) Lassaigne's solution is prepared by c heating

- a. Sodium metal in the fusion tube
- b. Sodium metal + water in the fusion tube
- c. Sodium metal + organic compound in the fusion tube
- d. Organic compound + water in the Fusion tube.

1684) When lime water turns milky, it d shows the presence of ----- in the organic compound.

- a. CO_2
- b. O_2
- c. H_2O
- d. Carbon

1685) Which observation confirms c sulphur in the organic compound when Lessing's solution is reacted with specific reagent?

- a. Prussian blue ppt



- b. Deep yellow ppt
- c. Black ppt
- d. While ppt

1686) Lessing's solution is reacted with d reagents like HNO_3 and AgNO_3 to detect

- a. N in the organic compound
- b. S in the organic compound
- c. o in the organic compound
- d. br in the organic compound

1687) Oxygen is present in organic d compounds when

- a. all of the below
- b. sum of % of C and %H = 100
- c. sum of %C and % of H > 100
- d. sum of %C and %H < 100

1688)

CHAPTER 16:

HYDROCARBONS

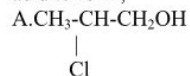
1689) Choose the correct statement about C cycloalkanes:

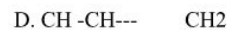
- A. Cyclopropane and cyclobutane are liquids at room temperature.
- B. Cycloalkanes are insoluble in ethanol and ether but soluble in water.
- C. Their melting & boiling points show gradual increase with increases molecular weight.
- D. Both (B) & (C) are correct

1690) The less energetic and more stable compound among the following is:

- A. Cyclobutane
- B. Hex-1-ene
- C. Cyclopropane
- D. Propene

1691) Propene react with hypochlorous acid to form;





1692) Benzene gives more stable product when undergo

- A) Nucleophilic addition reaction
B) Oxidation reaction
C) Electrophilic substitution reaction
D) Electrophilic addition reaction

C

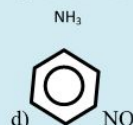
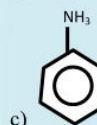
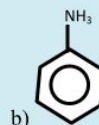
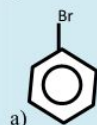
1693) The compound which can be hydrolyze by means of water is:

- A. CCl_4 B. SiCl_4
C. CH_4 D. Non of the above

B

1694) Which compound will undergo substitution reaction faster than benzene?
The IUPAC name of the compound given below:

B



1695) the IUPAC name of the compound given below

b



- a) m-nitrobenzoic acid
B. o-nitrobenzen methanoic acid
C.o-nitrobenzoic acid
D.None of the above

1696)	AlBr ₃ which is used in the alkylation of benzene possess the properties of: A. A catalyst B. A lewis acid C. An electron deficient specie D. All of the above	D
1697)	Choose the least stable of the following butenes; A.1-Butene B.CIS-2-butene C) Trans-2-butene D.Iso butylenes	A
1698)	1,3-dihydroxybenzene is also known as: A) Catechol B.Resorcinol c)hydroquinone D.Cresol	B
1699)	The carbon-carbon triple bond length in acetylene A.1.09 Å ⁰ B.1.119 Å ⁰ C)1.39 Å ⁰ D.1.19 Å ⁰	D
1700)	The number of chiral centres in a molecular of S-bromo 3-chloro hexan-2-ol is/are: a)1 b)3 c)2 d)5	B
1701)	Which group when attached to benzene will increase its reactivity: A.-NHR ⁺ B.-NH ₃ C.-C≡N D.-COR	A
1702)	The compound that cannot undergo addition reaction is: a) Cyclopropane B) Benzene C) Butyne D) None of the above A)More stable	D
1703)	The IUPAC name of the compound	



is

- A) 2-methyl-4-hexane
B) 4-isopropyl-2-butene
C) 5-methyl-2-hexane
D) 5,5-dimethyl-2-pentene

1704) If required conditions are provided, which compound on reaction with HOCl will not follow Markownikoff's rule:

- A) $\text{CH}_3\text{-CH=CH-Br}$
b) $\begin{array}{c} \text{CH}_3\text{---C=CH}_2 \\ | \\ \text{F} \end{array}$

1705) The number of Chiral center in the compound given below is/are



- A) 2 B) 3
C) Zero D) 1

1706) Alkene that do not follow cis-trans isomerism is:

- A) But-2-ene B) 1-chloroprene
C) 1,1-dichloropropene D) 1,2-dichloroethene

1707) Cyclic alkanes with greater angle strain are always:

- A) More stable B) Less energetic
C) More reactive
D) Obey general formula of normal alkanes

1708) The Friedel crafts catalyst " AlCl_3 " used in the substitution reactions of Benzene is a good:

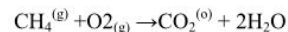
- A) Electrophile B) Lewis acid
C) Electron deficient specie D)



	d) bear all these properties		
1709)	The most reactive compound out of the following is; A)Ortho hydroxy toluene B)Ortho chloro ethyl benzene c) Phenol D)Para ethyl benzoic acid	A	
1710)	During the formation of addition polymerization, which smaller molecules you think are eliminated; A)O ₂ B)HCl C)NH ₃ D) no one is eliminated	D	
1711)	If the overlap of Sp ³ Hybrid orbitals in carbon atoms is smaller the bond so formed is: 2018Med A) Weak B) Strong C)Less energetic D) More Stable	A	
1712)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH} - \text{CH} \text{CH}_3 + \text{Mg ether} \rightarrow \text{X} - \text{H}_2\text{O} \rightarrow \text{Y} \\ \quad \\ \text{Cl}_2 \quad \text{Br} \end{array}$ In the above creation Compound Y will be an: (a) Alkane (b) Alkene (c) Alcohol (d) Alkyl halide	A	Hints; This reaction takes place in two steps. In the first step Grignard Reagent(X) is for Med]. In the second step when grignar reagent react with water, than an alkane (Y) is produced.S
1713)	What the required conditions for the following reaction? $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{CH}_3\text{Cl}_2 + \text{CHCl}_3 + \text{CCl}_4 + \text{HCl}$ (a) Low temperature (b) Al ₂ O ₃ catalyst 400 °C (c) ZnCl ₂ 250 °C (d) UV light	D	
1714)	CH ₄ on complete oxidation in the presence of cu as catalyst under 200 atm yield: [2012-83 Med]: (a) Methanol (b) Formaldehyde (c) Formic acid (d) Carbondioxide gas	C	



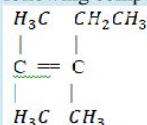
- 1715) The heat of combustion of hydrocarbon is very useful source of heat and power, Considering the combustion reaction given below.



ΔH for the reaction is.

- (a) $\Delta H = 213$ kcal/mole
(b) $\Delta H = 213$ kcal/mole
(c) $\Delta H = 426$ kcal/mole
(d) $\Delta H = 312$ kcal/mole

- 1716) Select proper IUPAC name of the following compound: A



- a) 2-methyl-3-ethyl-2-butene
(b) 3-ethyl-2-methyl-2-butene
(c) 2, 3-Dimethyl-2-pentene
(d) 2, isopropyl butane

- 1717) Dehydrohalogenation of alkyl halide is carried with: A
(a) Alcoholic KOH
(b) Aqueous KOH
(c) Aqueous NaOH
(d) Alcoholic NaOH

- 1718) Ethene could be obtained from ethyl bromide by: D
(a) Hydrolysis (b) Nucleophilic substitution
(c) Dehydration (d) dehydrohalogenation

- 1719) In which of the following solvents are alkenes the most soluble? C
(a) Water (b) Ethyl alcohol
(c) Ammonia (d) Carbon tetrachloride

- 1720) 2,3 dimethyl, 2butene undergoes A



catalytic Hydrogenation to give;

- (a) 2,2 dimethyl butane (b) 2 – methyl pentane
(c) 2,3 dimethyl butane (d) 3 – methyl pentane

1721) Ethene and Ethyne can be distinguished by employing the test: a

- (a) Br_2 in organic solvent
(b) Baeyer's reagent
(c) Phenyl Hydrazine (d) Tollen's reagent

1722) Select the o/p directing group but ring deactivators of the following? b

- (a) $-\text{CH}_3$ (b) $-\text{Cl}$
(c) $-\text{NO}_2$ (d) $-\text{OH}$

1723) Considering the addition of hydrogen acids to alkenes, what is the correct order of reactivity? b

- (a) $\text{HCl} > \text{HBr} > \text{HI}$ (b) $\text{HI} > \text{HBr} > \text{HCl}$
(c) $\text{HBr} > \text{HI} > \text{HCl}$ (d) $\text{HCl} > \text{HI} > \text{HBr}$

1724) The addition of HX to a double bond the hydrogen goes to the carbon that already has more hydrogen is a statement of:

- (a) Hund's rule (b) Markownikov's rule
(c) Huckel rule (d) None of the above

1725) Markownikoff's rule is NOT applicable when HBr is added to: B

- (a) 3-pentene (b) 2-Butene
(c) 1-Butene (d) Propene

1726) Carbon-carbon double bond as compared to single bond is: B

- (a) less susceptible to oxidation



- (b) More susceptible to oxidation
- (c) Equally susceptible to oxidation
- (d) All of these

1727) Baeyer's reagent is: D

(a) $HCl + ZnCl_2$ (b) H_2NNH_2

- (c) Br_2 in CCl_4 (d) Dil K
MnO₄

1728) Which one of the following would you suggest to locate the position of the double bond between carbon atoms in an organic compound? C

- (a) Addition of Bromine water
- (b) Addition of HI
- (c) Oxidation with ozone
- (d) All of the above

1729) Which of the following compounds on hydrolyses gives Ethyne? A

- (a) CaC_2 (b) Mg_2C_3
- (c) Al_4C_3 (d) $CuCl_2$

1730) Ethyne has a total of: a

- (a) one σ bond, two π bonds
- (b) one σ bond, four π bonds
- (c) two σ bonds, four π bonds
- (d) three σ bonds, two π bonds

1731) Which one of the following will be more acidic? B

- (a) 1-Pentene (b) 1-Pentyne
- (c) 3-Hexyne (d) 2-Pentyne

1732) Metallic carbide on treatment with water give a colourless gas which burns readily in air and gives a white precipitate with $AgNO_3 + Na$

OH the gas is:

- (a) CH_4 (b) C_2H_2



	(c) C_2H_4	(d) C_2H_6		
1733)	Which of the following would you consider to be comparatively more reactive? (a) C_2H_6 (b) C_2H_4 (c) C_2H_2 (d) C_3H_8		B	Reactivity Order = Alkene > Alkyne > Alkane
1734)	The reduction of 2-butyne to n-butane in laboratory involves: (a) The use of an oxidizing agent such as $Cr_2O_7^{2-}$ in the presence of acids. (b) The use of strong base such as KOH along with $NaNH_2$ (c) The use of hydrogen gas in the presence of Nickel as catalyst (d) The use of Al_2O_3 as catalyst and water in the form of steam		C	
1735)	Benzene is the prime member of: (a) A cyclic compounds (b) All cyclic compounds (c) Hetro cyclic compounds (d) Aromatic compounds		D	
1736)	Select the correct formula of 2-methyl pentane: (a) C_5H_{12} (b) C_5H_{16} (c) C_6H_{12} (d) C_6H_{14}		D	
1737)	Choose the correct statement; (a) Resonance hybrids are the weighted average of all the resonating forms (b) Resonance hybrids are generally considered as unstable. (c) Resonance hybrids are the averagely of all the resonance forms (d) Resonance hybrids are averaged of all the less stable resonating forms		A	
1738)	When acetylene is passed through hot iron tube at $400^\circ C$ it gives: (a) Benzene (b) O – xylene		A	



	(c) Toluene (d) polythene	
1739)	A nucleophile is; (a) Lewis acid (b) Bronsted acid (c) Bronsted base (d) Lewis base	D
1740)	Species in search of the positive charge are called; (a) Reducing agent (b) Nucleophile (c) Bases (d) Electrophile	B
1741)	Which of the following is a nucleophile? (a) AlCl_3 (b) CN^- (c) H_3O^+ (d) BF_3	B
1742)	Which of the following is not a nucleophile? (a) NH_3 (b) HO (c) $\text{HC}=\text{CH}$ (d) Br	D
1743)	Which of the following is not an electrophile? (a) H_3O^+ (b) AlCl_3 (c) CN^- (d) BF_3	C
1744)	Compared to benzene, nitration of toluene takes place at: (a) Slower rate (b) faster rate (c) same rate (d) depends on the conditions	B
1745)	The catalyst used in Friedel-Crafts reaction; (a) Lewis base (b) Lewis acid (c) amphoteric compounds (d) none of these	B
1746)	AlCl_3 generally behaves as: (a) Lewis acid (b) Bronstead base (c) Bronstead acid (d) Lewis base	A
1747)	Benzene reacts with acetyl chloride in the presence of Lewis acid forming: (a) Chlorobenzene (b) Acetophenone	B



(c) Benzoic acid (d)
benzophenone

1748)	The most reactive compound among the following is: [2012-63 Eng]: (a) Nitrobenzene (b) Toluene (c) Benzoic acid (d) Benzene	B	
1749)	The catalytic hydrogenation of benzene yields; (a) Xylene (b) Cyclohexane (c) Toluene (d) Benzoic acid	B	
1750)	Why it is so that if aromatic compounds, burned In air, produce a very smoky flame? A) Aromatic compound cannot be completely converted into CO ₂ and other products during burning B) The available amount of oxygen present in air is not sufficient to completely burn available compound C) Aromatic compound produces compounds on burning that are of black colour D) None of the above	a	
1751)	When a mixture of Benzene vapours and air is passed over V ₂ O ₃ at 450°C, Benzene is oxidized with the rupture of Benzene ring. Identify the product of the reaction; (a) Carbon dioxide and water (b) Maleic anhydride (c) Succinic anhydride (d) Acetic anhydride	B	
1752)	Which statement is NOT true about benzene? (a) Benzene is a planer molecule with bond angles 120° (b) It is completely miscible with water (c) It can be converted into a	b	



cyclohexane by hydrogenation
(d) It can be converted into ethyl a benzene when reacted with ethyl chloride and AlCl_3

- 1753)** Which of the following products is obtained from benzene is treated with chlorine in the presence of strong ultraviolet rays?
(a) Chlorobenzene (b) O-dichlorobenzene
(c) Hexachlorobenzene (d) P-dichlorobenzene

C

- 1754)** Phenol is an ortho-para orienting because the hydroxyl group:
(a) increases the electron density at meta position favouring nucleophilic attack
(b) increases the electron density at meta position favouring electrophilic attack
(c) increases the electron density at O/P positions favouring nucleophilic attack
(d) increases the electron density at O/P positions favouring electrophilic attack

D

- 1755)** The Cl atom attached to benzene ring is:
(a) M-directing
(b) O-directing
(c) O- and p-directing and deactivating
(d) O- and p-directing and activating

C

- 1756)** Which of the following group is considered to have a deactivating effect during aromatic substitution?
(a) $-\text{OH}$ (b) $-\text{NH}_2$
(c) $-\text{CH}_3$ (d) $-\text{CN}$

D

- 1757)** Which of the following species deactivate the Benzene ring when attached to Benzene ring.

B



- (a) C_2H_5 (b) SO_3H
(c) NH_2 (d) CH_3

1758)	Which of following functional groups are deactivating and not ortho, para directing? (a) $-R$ (b) $-COR$ (c) $-NH_2$ (d) NR	B	
1759)	Which one of the following molecules does not contain nitrogen? (a) Aniline (b) Pyridine (c) Hydrazine (d) Naphthalene	d	
1760)	Benzene undergoes substitution reactions more easily than addition reactions because: (a) of its cyclic nature (b) of having three double bonds (c) of aromatic character (d) of delocalization of electrons	B	
1761)	Which of the following compounds undergoes nitration most readily? a) Benzene b) Toluene c) Benzoic acid d) Nitrobenzene	B	Substituents on benzene makes it more reactive. Ortho/para directing makes it more reactive except halogens while meta directing makes is less reactive.
1762)	Which of the following is a lewis acid? a) CH_3OH b) $AlCl_3$ c) NH_3 d) CH_3OCH_3	B	
1763)	Which of the following substituents is an Ortho and Para director and ring deactivating? a) $-OH$ b) $-NH_2$ c) $-Cl$ d) $-OCH_3$	B	
1764)	Choose the IUPAC name of the following compound: $\begin{array}{c} CH_3 \\ \\ CH_3 - CH - CH - CH = C \end{array}$ A) 4- Methyl-2-Pentene B) 2- Methyl-3- Pentene	C	



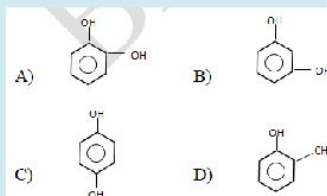
- C) 2- Methyl-2- Pentene
D) 4,4-Dimethyl-2-Pentene

1765) Select alkene of the following hydrocarbons:

- A) C_5H_{22} B) C_5H_{10}
C) C_5H_8 D) C_4H_{10}

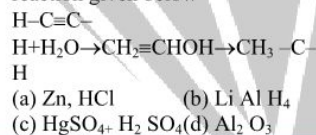
1766) Select cresol out of the following benzene derivatives?

D



1767) What is the suitable catalyst for the reaction given below

C



1768) What volume of oxygen is required for complete combustion of 5cm³ of CH₄ and 5cm³ of C₂H₄ in same conditions?

B

- (a) 5cm³ (b) 10cm³
(c) 25cm³ (d) 15cm³

1769) Which of the following compounds has acidic hydrogen?

C

- (a) Ethylene (b) 2-butyne
(c) Propyne (d) 3-butadiene

1770) The correct order of the reactivity of hydrocarbon given below is:

A

- (a) $C_2H_4 > C_2H_2 > C_6H_6$
(b) $C_6H_6 > C_2H_4 > C_2H_2$
(c) $C_2H_4 > C_2H_2 > C_6H_6$
(d)

1771) Select meta directing group of the

C



following?

- (a) $-\text{OH}$ (b) $-\text{NR}_2$
(c) $-\text{CN}$ (d) $-\text{OR}$

1772)	In the $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH} + \text{H}_2\text{O} \rightarrow ?$ (a) $\text{CH}_3\text{CHO} + \text{CH}_3\text{CHO}$ (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2 - \text{OH}$ (c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ (d) $\text{CH}_3\text{CH}_2\text{COCH}_3$	D	
1773)	If aliphatic hydrocarbon has its entire valency full satisfied then is called as _____ hydrocarbon (a) carboxylic (b) saturated (c) unsaturated (d) Aromatic	(b)	When all valences of carbon atoms are satisfied by carbon or hydrogen atoms, then it is called saturated hydrocarbon i.e. alkane.
1774)	If an aliphatic hydrocarbon does not have its valences fully satisfied but it has double bonds it is called as _____ hydrocarbons (a) carboxylic (b) Saturated (c) Unsaturated (d) aromatic	(c)	An aliphatic; hydrocarbon having double bonds between the carbon atoms is unsaturated hydrocarbon.
1775)	The saturated hydrocarbons usually end with suffix _____ (a) Ane (b) Ene (c) Yne (d) Oic	(a)	Saturated hydrocarbons called alkanes or cycloalkanes with ending name 'an'.
1776)	The hydrocarbons having double bonds normally end with suffix (a) Ane (b) Ene (c) Yne (d) Oic	(b)	The unsaturated hydrocarbons having double bond called alkenes or cycloalkenes.
1777)	The hydrocarbons having triple bonds normally end with suffix (a) Ane (b) Ene (c) Yne (d) Oic	(c)	The hydrocarbons containing triple bonds between the carbon atoms are called alkynes.
1778)	To differentiate isomers we use (a) n- (b) iso- (c) neo (d) all of them	(d)	Various isomers of an alkane are commonly differentiated by prefixes n(normal), iso (branched) and neo alkanes.
1779)	Alkenes are also named by	(b)	In common method alkenes are also named as alkylenes e.g. $\text{H}_2\text{C} = \text{CH}_2$



replacing one of the double bonds with

- (a) Ane (b) Ylene
(c) Yne (d) Die

is ethene, it is also called as ethylene.

1780)	Alkenes normally have _____ geometry (a) Tetrahedral (b) Linear (c) Planar (d) None	©	In alkenes the doubly bonded carbons are sp^2 hybridized and sp^2 hybrid orbitals are coplanar at an angle of 120° .
1781)	Alkenes are hydrogenated to alkanes in the presence of (a) Ni (b) Pt (c) Both a and b (d) None of them	©	Hydrogenation of $C \equiv C$ double bond means addition of H_2 . It forms alkanes. It is catalysed by Ni or Pt. If Ni is catalyst then a temp of $200 - 300^\circ C$ applied, but for Pt room temperature is required.
1782)	The temp. used for the hydrogenation of alkenes using Ni is (a) $200^\circ C$ (b) $400^\circ C$ (c) $200 - 300^\circ C$ (d) $1000^\circ C$	(c)	Hydrogenation of alkenes in presence of Ni catalyst is carried out at $200 - 300^\circ C$.
1783)	To prepare alkene from alkyl halide the process used is (a) Substitution (b) Hydrogenolysis (c) Elimination (d) None of them	(C)	The elimination of H and X from two adjacent carbon atoms of an alkyl halide gives alkene.
1784)	Which is a free radical (a) CH_4 (b) CO_2 (c) CH_2COO (d) CH_3	(d)	CH_3 contains an unpaired electron on C-atom, thus called as free radical. It is generated during photochemical halogenation of methane.
1785)	Hydrazine is used in (a) Clemmensen reduction (b) Wolff-Kishner reduction (c) Kolb's electrolysis (d) Wurtz reaction	(b)	In the reduction of aldehydes to alkanes N_2H_4 with KOH is used as reducing agent. It is called Wolff-Kishner reduction $H_3C - CHO + 4H \rightarrow CH_3 - CH_3$
1786)	$Zn + HCl$ are used in (a) Clemmensen reduction	(a)	Clemmensen reduction of ketones to alkanes takes place in presence of Zn



	(b) wof kishner reduction (c) kolb's electrolysis (d) wutruz reaction		+ HCl. $\text{H}_3\text{C} - \text{CO} - \text{CH}_3 + 4\text{H} \rightarrow \text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2$
1787)	C_1 ----- C_4 hydrocarbons are normally (a) Gases (b) liquids (c) Solid (d) plasma	(c)	CH_4 , C_2H_6 , C_3H_8 and C_4H_{10} are gases.
1788)	C_5 ----- C_{17} hydrocarbons are normally (a) Gases (b) liquids (c) Solid (d) plasma	(b)	From pentane to heptadecane are colourless odouless liquids.
1789)	C_{18} and onward hydrocarbons are normally (a) Gases (b) liquids (c) Solid (d) plasma	(c)	Hydrocarbons from C_{18} onward are waxy solids like paraffin, asphalt or petroleum coke.
1790)	Alkanes are normally (a) Nonpolar (b) Polar (c) Strongly polar (d) All of these	(a)	In alkanes there C – C single bonds which are non polar and C – H onds also non polar.
1791)	Which can dissolve alkanes (a) Benzene (b) n-hexane (c) Ether (d) All of these	(d)	All these solvens are almost non polar which dissolve alkanes (the non polar hydrocarbons)
1792)	The B.P. increases by _____ for addition of CH_2 group to an alkane molecule (a) 20°C (b) 40°C (c) $30 - 40^\circ\text{C}$ (d) $20 - 30^\circ\text{C}$	(d)	Usually b-pts, increase at this rate with increase in molecular mass by 14 in alkanes.
1793)	The B.P. of branched hydrocarbons are _____ than their normal chain isomers (a) Higher (b) Lower (c) Same (d) Moderate	(b)	Normal alkanes have greater chain of C-atoms, so have stronger attraction as the centres for attractive forces increase with longer chains. Therefore boiling points of n-alkanes are higher than their branched isomers.
1794)	The general reaction of alkanes are based on mechanism (a) Free radical	(a)	The reactions of alkanes are substitution reactions which take place at high temperature or on



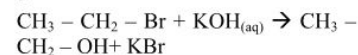
	(b) Ion exchange (c) Ionic (d) None of them	absorption of light energy through the formation of highly reactive free radicals.
1795)	The complete combustion of alkanes normally gives (a) $\text{CO}_2 + \text{H}_2\text{O}$ (b) $\text{CO} + \text{H}_2\text{O}$ (c) CO_2 only (d) CO only	(a) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$. it is highly exothermic reaction.
1796)	Which are the suitable condition of catalytic oxidation of alkanes (a) Cu and 400°C (b) Pt and room temperature (c) Ni and 250°C (d) V_2O_5 at 100°C	(a) The catalytic oxidation of methane gives methanol, then formaldehyde, formic acid $\text{CH}_4 + \text{O} \text{Cu} \rightarrow 400^\circ\text{C} \text{CH}_3 - \text{OH}$
1797)	Nitroalkane are used in (a) Fuel (b) Solvents (c) Organic synthesis (d) All of them	(d) Nitroalkanes are used as fuel, solvents and in organic synthesis.
1798)	The correct order of reactivity of halogens with alkanes is (a) $\text{I}_1 > \text{Br}_2 > \text{Cl}_2 > \text{F}_2$ (b) $\text{I}_2 > \text{Cl}_2 > \text{F}_2 > \text{Br}_2$ (c) $\text{F}_2 > \text{Cl}_2 > \text{I}_2 > \text{Br}_2$ (d) $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$	(d) The reactivity of F_2 is maximum and the order of reactivity is $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$. I_2 is least reactive
1799)	Which are the steps of free radical mechanism (a) Initiation (b) Propagation (c) Termination (d) All of them	(d) Free radical reactions are chain reactions. It means free radicals are generated initially, which further react to give the other free radicals. Finally chain reaction is terminated by the combination of free radicals.
1800)	Alkene having only one double bond are called (a) Monoene (b) Diene (c) Dienophile (d) None of them	(a) Some monoenes are $\text{CH}_3 - \text{CH} = \text{CH}_2$, $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$. Alkenes containing two double bones are called dienes e.g. $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$ (1,3-putadiene)
1801)	Alkyl halide can be dehydrohadogenated to alkene in	(c) $\text{CH}_3 - \text{CH}_2 - \text{Br}_2 + \text{KOH} \rightarrow \text{H}_2\text{C} = \text{CH}_2 + \text{KBr} + \text{H}_2\text{O}$



the presence of

- (a) KOH (b) KOH(aq)
(c) KOH(alc) (d) All of them

Ut with aqueous KOH alkylhalides give alcohols.



1802)	Which can be used for dehydration of alcohol (a) P_4O_{10} (b) H_2SO_4 (c) H_3PO_4 (d) All of them	(a)	All these are dehydrating agents.
1803)	The order of dehydration of alcohol (a) $1^\circ > 2^\circ > 3^\circ$ (b) $1^\circ > 3^\circ > 2^\circ$ (c) $2^\circ > 3^\circ > 1^\circ$ (d) $3^\circ > 2^\circ > 1^\circ$	(d)	Ter-alcohols (3°) are easily dehydrated and P alcohols (1°) dehydrated with difficulty as indicated by the following reactions. $\text{R} - \text{CH}_2 - \text{CH}_2 - \text{OH}$ (P-alcohol (1° alcohol)) $75\% \text{H}_2\text{SO}_4 \rightarrow \text{R} - \text{CH} = \text{CH}_2 + \text{H}_2\text{O}$ CH_3 $\text{R} - \text{C} - \text{OH} \xrightarrow[85^\circ\text{C}]{20\% \text{H}_2\text{O}_4} \text{R} - \text{C} = \text{CH}_2 + \text{H}_2\text{O}$ CH_3 CH_3
1804)	The dehalogenation of vicinal dihalides involves Zn and (a) Anhydrous solvent (b) Methanol (c) Acetic acid (d) Any of these	(d)	In water the catalytic activity of Zn is decreased as Zn reacts with water.
1805)	Which is Lindler's catalyst (a) $\text{Pd}(\text{EaSO}_4)$ (b) BaSO_4 (c) Pt (d) Quinoline	(a)	But this catalyst is used in quinoline to poison the catalyst. $\text{R} - \text{C} = \text{C} - \text{R} + \text{H}_2 \xrightarrow{\text{Pd/BaSO}_4 / \text{Quinoline}}$ $\text{R} \quad \text{H}$ $\text{C} = \text{C}$ $\text{H} \quad \text{R}$
1806)	The heat of hydrogenation of most of alkenes is about _____ KJ/mole (a) 100 (b) 120	(b)	Hydrogenation of alkenes is highly exothermic process and the heat of hydrogenation of most of the alkenes is about 120 KJ per mole for one double bond present in a molecule.



	(c) 140	(d) 103	
1807)	Ni – Al alongwith caustic soda require _____ atm. Pressure for hydrogenation of alkenes (a) 1 (b) 100 (c) 10 (d) 3	(d)	Most of the alkenes are hydrogenated over Reney Ni at about 100°C and upto 3 atmospheres pressure.
1808)	The order of reactivity of halogen acids with alkenes is (a) HI > HCl > Hbi (b) HI > HBr > HCl (c) HCl > HI > HBr (d) HCl > HBr > HI	(b)	HI is the strongest acid and the order of reactivity of halogens acids is aHI > HBr > HCl
1809)	Markonikov's rule is applicable to _____ alkenes (a) Symmetrical (b) Unsymmetrical (c) Both a and b (d) None of them	(b)	Rule states that in addition of H – X to unsymmetrical alkene the negative part X attaches with that doubly bonded carbon which has least numer of hydrogen atoms. e.g. $\text{H}_3\text{C} - \text{CH} = \text{CH}_2 + \text{H} - \text{Br} \rightarrow \text{CH}_3 - \text{CH}(\text{Br}) - \text{CH}_3$
1810)	De halogenation of tetrahalides happens in the presence of active metal like (a) Zn (b) mg (c) Both a and b (d) None of them	(a)	Zn is most effective in removing halogens form di or tetrahalides.
1811)	First three members of alkyne series are (a) Liquids (b) Solids (c) Gases (d) Plasma	(c)	Low molecular masses alkynes upto four carbon atoms are gases.
1812)	Alkynes having C ₄ – C ₁₂ chains are _____ in nature (a) Liquids (b) Solids (c) Gases (d) Plasma	(a)	C ₅ – C ₁₂ alkynes are liquids.
1813)	Which of the following generally	(d)	In benzene the C : H ratio is 1 : 1 which is lower than that in alkanes,



have low carbon to hydrogen ratio?

- (a) alkanes
- (b) alkanes
- (c) alkanes
- (d) aromatic hydrocarbon

alkenes and alkynes as their general formulas are C_nH_{2n+2} , C_nH_{2n} and C_nH_{2n-2}

2

1814)	The simplest and the parent members of aromatic hydrocarbon is (a) Benzene (b) Toluene (c) Biphenyl (d) Naphthalene	(a)	When aromatic compounds of high molecular mass are degraded the simplest product obtained is benzene or its derivative. Hence benzene is regarded as the simplest and the parent member of this class of compound.
1815)	Which of the following is a monocyclic aromatic hydrocarbon (a) Toluene (b) Phenol (c) Aniline (d) None of them	(a)	Toluene has the molecular formula $C_6H_5 - CH_3$. It is a hydrocarbon but phenol ($C_6H_5 - OH$) and aniline ($C_6H_5 - NH_2$) are not hydrocarbons.
1816)	Which of the following is not a polycyclic aromatic hydrocarbon? (a) Biphenyl (b) Naphthalene (c) Naphthol (d) None of them	(c)	Naphthol ($C_{10}H_7 - OH$) is not a hydrocarbon biphenyl ($C_6H_5 - C_6H_5$) an Naphthalene ($C_{10}H_8$) are hydrocarbons.
1817)	Which is not a representation of benzene? (a) PH (b) Aryl (c) Phenyl (d) None of them	(d)	All represent benzene/
1818)	For benzene _____ open chain structure were proposed (a) Two (b) Five (c) Seven (d) No	(d)	i. $H_2C = CH - C = CH = CH_2$ ii. $HC = C - CH_2 - CH_2 - C = CH$ 1,5-Hexadyne
1819)	For benzene _____ closed chain structure were proposed (a) Two (b) Five (c) Seven (d) No	(b)	There are two Kekulé and three Dewar structures which are ring structures.
1820)	Dewar predicated _____ closed structure for benzene (a) Two (b) Five	(b)	There are three closed structures for benzene suggested by Dewar, but these have para bonds like $C_1 - 4$, $C_2 - 5$, $C_3 - 6$



(c) Seven (d) No	
1821) Cyclohexane can be converted not (b) benzene in the presence of	Pt $\rightarrow +3H_2$ 250°C
(a) pt at 100°C (b) pt at 250°C (c) Pd at room temperature (d) Pt at room temperature	
1822) A single benzene ring can have (b) ortho position maximally	When a second group is introduced into the mono substituted benzene the chance of ortho-disubstituted benzene is 40%. As for five vacant positions, each position has 20% chance of disubstitution. Therefore there are two ortho positions in a single benzene.
(a) One (b) Two (c) Three (d) Four	
1823) A single benzene ring can have (b) para position maximally	When a second group is introduced into the mono substituted benzene the chance of para-disubstituted is 20% as each position for disubstitution has 20% chance, therefore there is only one para position in a benzene.
(a) One (b) Two (c) Three (d) Four	
1824) The substituent which is attached (a) first to the ring before other substituents is called _____	The substituent present on the benzene ring directs the incoming substituents. Therefore it is called reference group.
(a) Reference group (b) Main group (c) Reactive group (d) Functional group	
1825) The atom or group attached (a) opposite to para position is called as	The para position on the benzene ring is determined with respect to the reference atom or group already present on the ring
(a) Reference atom (b) Opposite atom (c) main atom (d) Active atom	
1826) For halogenation of benzene © normally we use	
(a) Light (b) Radiation (c) Sunlight (d) None of these	



- 1827)** The structure of benzene is
(a) Planer (b) Tetrahedral
(c) Linear (d) Coplanar
- 1828)** Benzene normally show _____ reactions
(a) Addition (b) Substitution
(c) Limiting (d) Elimination
- 1829)** In Benzene, the un hybridized orbital is
(a) P_x (b) P_y
(c) P_z (d) SP^3
- 1830)** Atomic orbital treatment gave the concept of
(a) Hybridization (b) Localization
(c) Delocalization (d) None of these
- 1831)** The molecular mass determined by vapour density method for benzene was
(a) 70.108 (b) 80.108
(c) 90.108 (d) 78.108
- 1832)** The electro density is present _____ of the benzene ring
(a) Side wise (b) Above
(c) Below (d) Both b and c
- 1833)** The small angles of cyclopropane B indicate that overlap between orbitals is
(A) Maximum
(B) Not maximum
- (a) As all C-atoms in the benzene ring are sp^2 hybridized and sp^2 hybrid orbitals are coplanar therefore structure of benzene is planar.
- (b) General pattern of reactivity of benzene towards electrophiles is substitution of the electrophile replacing H^+ , which is also an electrophile.
- (c) As each C-atom in benzene is sp^2 hybridized therefore sp^2 hybridization involves mixing of $2p_x$ and $2p_z$ orbitals with 2s orbital. It leaves behind $2p_y$ unhybridized.
- (c) The unhybridized $2p_z$ orbitals on each C-atom are parallel to one another. These overlap to form a continuous sheath of electron cloud, enveloping, above and below the six C – C sigma bonds. This overlapping gives delocalized electron cloud.
- (d) Molecular mass of benzene = 6 x empirical formula
= 6 x 13 = 78. It
It is confirmed by vapour density method.
- (d) There are 6 unhybridized 2p orbital on the six benzene planar carbons. The p-orbital has two lobes. Therefore the sideways overlap of these p-orbitals forms a continuous sheath of electron cloud, enveloping, above and below the six C – C sigma bonds of the benzene ring.
- Small angle in cyclopropane means large angle strain. Due to large angle strain orbitals do not overlap effectively and cyclopropane molecule is unstable.



	(C) Normal		
	(D) None of these		
1834)	Which one has the greatest angle strain?	A	The deviation of an angle value from the normal angle value predicted by hybridization called angle strain. Interior bond angle in cyclopropane is 60° while normal angle of sp^3 hybridized carbon 109.5° so the angle strain is $109.5^\circ - 60^\circ = 49^\circ$ while in case of cyclobutane it is $109.5^\circ - 90^\circ = 19.5^\circ$, in case of cyclopentane it is $109.5^\circ - 108^\circ = 1.5^\circ$, it decreases as ring size increases.
	(A) Cyclopropane		
	(B) Cyclobutane		
	(C) Cyclopentane		
	(D) Cyclohexane		
1835)	Which of the following is least reactive?	C	Trans - 2 - butane is more stable and least reactive. It produces the least heat of combustion.
	(A) 1 - butane		
	(B) Cis - 2- butane		
	(C) Trans -2 - butane		
	(D) All have same reactivity		
1836)	Among paraffin's it is found that with an increase in molar masses	C	As the molar masses increases, the length of the chain increases and more attractive forces develop in them thus its boiling point increases. Straight chain paraffin's have higher boiling point than branched chain.
	(A) Vapor density decreases		
	(B) Freezing point decreases		
	(C) Boiling point increases		
	(D) Boiling point increases		
1837)	Grignard's reagents react with active-hydrogen compounds to form	A	Grignard reagent react with active hydrogen compound forms the alkane, as
	(A) Alkanes		$CH_3 - CH_2MgBr + HCl \rightarrow CH_3 - CH_3 + Mg \begin{matrix} Br \\ \\ OH \end{matrix}$
	(B) Alkenes		$CH_3MgBr + H - OH \rightarrow CH_4 + Mg \begin{matrix} Br \\ \\ OH \end{matrix}$
	(C) Alkynes		
	(D) Alcohols		
1838)	Which of the following increases with increasing carbon chain?	D	With the increase of carbon chain, the molecule weight as well as force of attraction is increase therefor melting point, specific gravity and viscosity are regularly increased .
	(A) Melting point		
	(B) Specific gravity		
	(C) Viscosity		
	(D) All of these		
1839)	Which of the following has high B.P?	A	n-alkane has higher boiling point as compared to iso-alkane and neo-



	(A) N-pentane (B) Iso-pentane (C) Neo-pentane (D) Butane		alkane because in n-alkane the area of contact is very high due to which the force of attraction is very high and hence have high boiling point as compared to iso and neo-alkane.
1840)	Which one has maximum angle strain? (A) Cyclopentane (B) Cyclobutane (C) Cyclopropane (D) Cyclohexane	C	Due to small ring size the deviation of angle value is more than the normal angle value (109.5°) therefore it shows maximum angle strain.
1841)	Methane, ethane, propane, butane are (A) Gases (B) Solids (C) Liquids (D) Only methane is gas	A	The first four member of alkanes are gaseous in nature. C_4 to C_{18} are liquids and C_{18} onwards are solid
1842)	The order is the ease of dehydration of alcohol is (A) Tertiary > secondary > primary (B) Primary > secondary > tertiary (C) Secondary > primary > tertiary (D) Primary > tertiary > secondary	A	The rate of dehydration is related to the ease of formation of carbocation the ease of formation of carbocation is Tertiary > secondary > Primary, so the alcohol which produces tertiary carbocation undergo dehydration easily then secondary and the tertiary, so the ease of dehydration of alcohol is 3° alcohol > 2° alcohol > 1° alcohol.
1843)	The order of reactivity of halogens towards alkene is (A) $F_2 > I_2 > Cl_2 > Br_2$ (B) $I_2 > Br_2 > Cl_2 > F_2$ (C) $F_2 > Cl_2 > Br_2 > I_2$ (D) $Cl_2 > Br_2 > I_2 > F_2$	C	The reactivity of halogen towards alkene decreases down the group. Fluorine is the most reactive and iodine is least reactive
1844)	Which of the following test is used for location of $C = C$ bond in alkene. (A) Br_2 test (B) Ozonolysis reaction (C) Both of these (D) None of these	B	By studying the product of ozonolysis we can determine the position of double bond in alkene.
1845)	Point out the most reactive hydrocarbon	B	Alkene is most reactive due to the presence of weak localized π -bond as



- (A) Alkane
 (B) Alkene
 (C) Alkyne
 (D) All of them
- compared to π -bond of alkyne and strong sigma bond in alkane.

1846)	Ozonolysis of 2-methyl-2-butane gives	C	It will give aldehyde and ketone
(A)	Aldehyde		
(B)	Ketone		
(C)	Aldehyde + ketone		
(D)	None of these		
1847)	The molecule of acetylene possess which hybridization?	A	The molecule of acetylene undergo sp hybridization according to the formula. Hybridization = lone pair + number of atoms attach to the central atom = $2 + 0 = 2$. The correct option is sp .
(A)	sp		
(B)	sp^2		
(C)	sp^3		
(D)	dsp^2		
1848)	The geometry of acetylene is	C	As in acetylene the carbon atom is sp hybridized. So the geometry of acetylene is linear $H-C \equiv C-H$
(A)	Angular		
(B)	Bent		
(C)	Linear		
(D)	Trigonal		
1849)	The correct reactivity order of alkane, alkenes, alkyne and benzene is:	C	Among alkane, alkyne, alkene and benzene, alkane is less reactive because it contains only sigma bond which is stronger and difficult to break. While alkene and alkyne contains localized π -bond. Benzene contains delocalized π -bond. That makes it least reactive. The π -bond of alkyne is stronger than the π -bond of alkene. So the correct order of reactivity is alkene > alkyne > benzene > alkane
(A)	Alkane > alkene > Benzene > Alkyne		
(B)	Alkyne > alkene > alkane > benzene		
(C)	Alkene > alkyne > Benzene > Alkane		
(D)	All are correct		
1850)	A hydrocarbon which is a liquid at room temperature decolorizes aqueous bromine, could be molecular formula of the compound?	A	Carbon from C_4 to C_{18} are liquid thus $C_{10}H_{20}$ is a liquid. Test for double bond (Bromination) is used in which bromine reacts with Alkene decolorize aqueous bromine.
(A)	$C_{10}H_{20}$		
(B)	C_2H_2		
(C)	C_2H_4		
(D)	C_7H_{16}		
1851)	A compound "V" is added to a	D	This test is used for the identification



solution of bromine in tertachloro methane and the color of bromine is immediately discharged. Which one of the following could be compound "V"

- (A) Benzene
- (B) Pentane
- (C) Cyclohexane
- (D) Pentene

of alkenes. The color of bromine is discharged in this test. So, the compound "V" will be Pentene.

1852)	The reaction of ethyl chloride with alcoholic KOH at 170° C to form ethene is:	C	It is an elimination reaction because chlorine is eliminated and a double bond is formed. Alcohol, 170°C $CH_3 - CH_2 - Cl + KOH \rightarrow KCl + H_2O + CH_2 = CH_2$
	(A) Addition reaction (B) Substitution reaction (C) Elimination reaction (D) Oxidation-reduction reaction		
1853)	The presence of double bond in ethene makes it	B	Ethene has pi bond which is loosely held bond. It makes ethene nucleophile in nature. The electron density of π - bond lies above and below the bond axis so it is more exposed to an electrophilic reagent. Ethene behaves as a nucleophile.
	(A) Electrophilic in nature (B) Nucleophilic in nature (C) Acidic in nature (D) Both a and b		
1854)	The overlap between C - H in Ethyne is	A	The triple bonded carbon atom of alkyne is sp hybridized which overlaps with 1s orbital of hydrogen and σ -bond formed by sp-s overlapping.
	(A) Sp - s (B) Sp ² - sp ² (C) Sp - sp (D) Sp ² - s		
1855)	Ethene and ethyne can be distinguished by	D	Ethyne reacts with ammonical silver nitrate solution and give yellow ppt while ethene does not react with ammonical silver nitrate solution. Because it is not strong enough to oxidize alkene. It is a weak oxidizing agent.
	(A) Anhydrous AlCl ₃ (B) Br ₂ in CCl ₄ (C) Cold H ₂ SO ₄ (D) AgNO ₃ in NH ₄ OH		
1856)	Choose the correct name according to IUPAC nomenclature	C	According to IUPAC rule.
	(A) 2 - Ethyl - 3 - methyl pentane (B) 3 - methyl cyclohexane		



	(C) 3-ethyl-2-methylpentane (D) 3-ethyl-4-methylpentane	
1857)	Which one of the following statement about the carbon-carbon bond in benzene is not true? (A) It is shorter than a C-C bond in alkane (B) It is shorter than a C=C bond in alkene (C) It is equal to C-C bond in alkane (D) All the carbon-carbon bonds are different in length	B In benzene the decolorization of π -bond occur. This delocalization causes carbon-carbon bond length to be (1.39Å). this value lies between pure C-C bond length 1.54Å and C=C bond length 1.34Å.
1858)	Which of the following compounds may exist as cis-trans isomers? (A) 1-butene (B) 2-butene (C) Cyclopropane (D) Acetone	B 2-butene can exist as cis-trans isomers because it contains double bond due to which restricted rotation occurs about it. each carbon possesses two different atoms/groups.
1859)	Which of the following compounds show geometrical isomerism? (A) $\text{CH}_2 = \text{CH}_2$ (B) $\text{CH}_3\text{-CH} = \text{CH}_2$ (C) $\text{CH}_3\text{CH} = \text{CHCH}_3$ (D) $\text{CH}_3 - \text{CH}_3$	C Because it can satisfy the conditions of geometrical isomerism. There is restricted rotation and also each carbon atom possess two different groups/atoms like H and CH_3 .
1860)	Catalyst used for Friedel craft reaction (A) HNO_3 (B) AlCl_3 (C) BeCl_2 (D) NaOH	B Lewis acids are used in F.C alkylation and acylation. The most commonly used catalyst is AlCl_3 .
1861)	Which one o/p but ring deactivator? (A) Cl (B) R (C) -OH (D) - NH_2	A All those substances which have at least one pair of electrons are O/P directing including alkyl groups like OH, NH, "X", R etc. halogens are ortho/para director but ring deactivator due to strong inductive effect (electron withdrawing effect).
1862)	Friedel craft reaction is less useful because (A) Reaction does not stop	A Polyalkylation occurs because alkyl group is electron donating group which further increase the reactivity



	at monoalkylation (B) It gives more side product (C) Ver slow reaction (D) None of these		of benzene ring. For further alkylation and hence reaction will not stop on monoalkylated product.
1863)	Which bonds are formed when toluene is oxidized to benzoic acid in the presence of potassium manganate (VII). (A) C – O (π) (B) C – O (C) C – OH (D) All	D	All these bonds are formed when benzoic acid is formed from toluene. One sigma bond and one pie bond along with C – OH bond. Three C – H bonds in toluene are broken down.
1864)	The nature of Hexaaquamanganese (II) ion is (A) Acidic (B) Basic (C) Neutral (D) Amphoteric	A	Hexaaquamanganese (II) ions due to acidic in nature. It can react with ammonia (base) by donating a proton as $[\text{Mn}(\text{H}_2\text{O})_6]^{2+} + \text{NH}_3 = [\text{Mn}(\text{H}_2\text{O})_5(\text{OH})]^+ + \text{NH}_4^+$
1865)	Which solutions can be used for testing chromate (VI) ions in solution (A) Barium chloride solution (B) Lead nitrate solution (C) Both (D) none	C	Both these tests can be used for testing chromate (VI) ions in a solution. When they react with chromate (VI) ions a yellow color solution is obtained. The bright yellow color suggests that it would be worth testing for chromate (VI) ions.
1866)	Grignard Reagent is the Name given to organic compounds in common system. This name is given according to---- of the compounds a. Property b. History c. Source d. Discoverer		
1867)	n-pentane, iso-pentane, and neo-pentane can be differentiated by a. Molecular formula b. Colour c. Boiling points d. All of the above		
1868)	Most reactive alkane is a. Methane	d	



- b. Ethane
- c. Propane
- d. Cyclopropane

1869) If one mole each of the following hydrocarbons is burnt completely then which one will produce greater amount of heat energy?

- a. Methane
- b. Ethane
- c. Propane
- d. Butane

1870) Highest angle strain is present in

- a. Cyclo butane
- b. Cyclo pentane
- c. Cyclo propane
- d. Ethane

1871) Hemolytic bond fission results in ----- formation

- a. Nucleophiles
- b. Electrophiles
- c. Free radicals
- d. All of the above

1872) Brown colour of bromine disappears when it is added to

- a. Cyclohexane
- b. Cyclopropane
- c. Cyclohexene
- d. Ethane

1873) Halohydrins are produced when alkenes are reacted with

- a. HOH
- b. HX
- c. X_2
- d. HOX

1874) An alkene produced propanal and methanol upon ozonolysis + Zn (H_2O). the starting alkene was?

- a. 2-butene
- b. Butane
- c. 1-butene
- d. 1,3-butadiene

1875) Which alkene shows conjugation?

- a. $CH_2 = CH-CH_2-CH_3$



- b. $\text{CH}_3\text{-CH}=\text{CH-CH}_3$
- c. $\text{CH}_2=\text{C}=\text{CH-CH}_3$
- d. $\text{CH}_2=\text{CH-CH}=\text{CH}_2$

1876)	Conjugation affects the	c	
	a. Hybridization of c atoms		
	b. Bond angles		
	c. Bond lengths		
	d. All of the above		
1877)	Which one of the following compounds does not show position isomerism?	d	
	a. Dichlorobenzene		
	b. Propanol		
	c. Butyne		
	d. Propene		
1878)	The compound having molecular formula $\text{C}_4\text{H}_{10}\text{O}$ can show:	d	
	a. Metamerism		
	b. Functional group isomerism		
	c. Positional isomerism		
	d. All of the above		
1879)	Methoxy methane and ethanol are	c	
	a. Position isomers		
	b. Chain isomers		
	c. Functional isomers		
	d. Optical isomers		
1880)	Isomerism which is only found in alkenes?	d	
	a. Metamerism		
	b. Functional group isomerism		
	c. Position isomerism		
	d. Cis-trans isomerism		
1881)	Alkynes are mostly prepared by	d	
	a. Addition reactions		
	b. Substitution reactions		
	c. Oxidation reactions		
	d. Elimination reactions		
1882)	Lindlar's catalyst is used to stop the hydrogenation of alkynes at alkenes formation. This catalyst is composed of	c	
	a. $\text{Zn-Hg} / \text{HCl}$		
	b. $\text{Ni-Pd} / \text{H}_2\text{O}$		



- c. Pd + BaSO₄ + Quinoline
d. Ni + BaSO₄ + Aniline

1883) Ethyne + HBr give the final product.

- a. I-bromoethene
b. I, 2-dibromoethane
c. I, i-dibromoethane
d. I, 2-dibromoethene

1884) Acetaldehyde is obtained when b is hydrated in the presence of H₂SO₄ and HgSO₄

- a. Methyl acetylene
b. Acetylene
c. Dimethyl acetylene
d. Ethyl methyl acetylene

1885) Ease of hydrogenation of hydrocarbons is in the following order.

- a. Ethane > ethene > ethyne
b. Ethyne > ethene > ethane
c. Ethane > ethyne > ethene
d. Ethane > ethyne > ethane

1886) Ethyl acetylene and dimethyl acetylene were passed through a container having inlet and outlet containing Ammonical silver nitrate solution. Which gas is trapped in the container?

- a. Dimethyl acetylene
b. Ethyl acetylene
c. Both a and b
d. None of them

1887) When acetyl chloride is reacted with benzene in the presence of AlCl₃ the reaction is called Friedel-Craft acylation. The product obtained is

- a. Toluene
b. Iso-propyl benzene
c. Methyl phenyl ketone
d. Chloro benzene

1888) Which statement is true regarding reactivity?



- a. Double bond is stronger than single bond hence alkenes are less reactive than alkanes.
- b. Alkenes do not undergo addition reactions.
- c. Alkenes decolorize bromine solution and Baeyer's reagents but alkynes do not.
- d. Towards the electrophilic addition reactions, alkenes are more reactive than alkynes.

1889) The carbon-carbon bond length in benzene is

- a. Equal to the C,C bond length in ethane
- b. Equal to the C,C bond length in ethane
- c. In between the C,C single and double bonds
- d. Variable

1890) The compound formed as a result of oxidation of methyl benzene (toluene) by KMnO_4 is

- a. Benzyl alcohol
- b. Benzoic acid
- c. Acetophenone
- d. Benzophenone

1891) The electrophile involved in the sulphonation of benzene is

- a. H_3O^+
- b. SO_3
- c. SO_3^+
- d. SO_3^{2-}

1892)

CHAPTER 17:

ALKYL HALIDES

1893) Which is not true about Grignard reagent?
A) They are highly reactive compounds

B

Grignard reagents are very stable and can not be isolated from ethereal solution.



- B) They are very stable compounds
& can be isolated easily
C) They have synthetic importance
D) They are represented by general
formula RMgX

1894)	Propene is unsymmetrical molecule the addition of HI will result in the formation of: (a) $\text{H}_3\text{C} - \text{CH} - \text{CH}_3$ (b) $\text{CH}_3\text{CH}_2\text{I}$ (c) $\text{CH}_3\text{CHCH}_3 + \text{CH}_3\text{CH}_2\text{I}$ (d) $\text{CH}_2 = \text{CH} - \text{CH}_3 + \text{H}_2$	A
1895)	Choose the correct product of the following reaction: $\text{CH}_3\text{CH}_2\text{OH} + \text{PCl}_5 \rightarrow$ (a) $\text{CH}_3\text{Cl} + \text{POCl}_3 + \text{H}_2\text{O}$ (b) $\text{CH}_3\text{CH}_2\text{Cl} + \text{POCl}_3 + \text{H}_2\text{O}$ (c) $\text{CH}_3\text{CH}_2\text{Cl} + \text{Cl} + \text{POCl}_3 + \text{HCl}$ (d) $\text{C}_2\text{H}_5\text{Cl} + \text{H}_3\text{PO}_3$	B
1896)	Which of the following reaction show nucleophilic substitution of alkyl halide R-X ? (a) $\text{RX} + \text{H}_2 \rightarrow \text{RH} + \text{HX}$ (b) $\text{RX} + \text{KCN} \rightarrow \text{RCN} + \text{KX}$ (c) $2\text{RX} + 2\text{Na} \xrightarrow{\text{Heat}} \text{R-R} + 2\text{NaX}$ (d) $\text{R-X} + \text{Mg} \xrightarrow{\text{Heat}} \text{RMgX}$	B
1897)	Displacement reaction that proceeds by the $\text{S}_\text{N}2$ mechanism are most successful with compounds that are: (a) Neopentyl system (b) Tertiary compound with no branch (c) Secondary halides (d) Primary compound with no branch at β -carbon	D
1898)	Which of the following carbonium ion is most stable?	A



- (a) R_3C^+ (b) $R_2\dot{C}H$
(c) $R\dot{C}H_2$ (d) $\dot{C}H_3$

1899) Which of the following compounds comparatively would react rapidly in an SN^2 reaction? C

- (a) $(CH_3)_3Cl$ (b) $(CH_3)_2CHI$

- (c) CH_3CH_2I (d) $CH_2=CHI$

1900) Methane can be prepared by the reaction of; d

- (a) iodomethane with sodium in dry ether
(b) methanol with conc H_2SO_4
(c) sodiummethanoate with soda lime
(d) reduction of dimethane

1901) The reaction of alkyl halide with ammonia is called. B

- (a) Wurtz reaction (b) Hoffman reaction
(c) Frankland's reaction (d) Friedel-Crafts reaction

1902) When 2-Bromo-2-methyl propane undergoes unimolecular elimination reaction, the product obtained will be: B

- (a) 2-Methyl propane: (b) 2-Methyl propane:
(c) 2-Methyl-1 propanol: (d) 2-pentanol

1903) The acid-catalyzed dehydration mechanism for alcohol is best described as a/an: B

- (a) E_1 (b) E_2
(c) S_N^1 (d) S_N^2

1904) Grignard reagent is prepared by reacting: A

- (a) Alkyl halide and Mg
(b) Alkane and Mg
(c) Alcohol and Mg
(d) None of them



1905)	What product is obtained when methyl magnesium chloride reacts with ammonia: (a) Methane (b) Methylamine (c) Ethylamine (d) Methyl Chloride	A
1906)	Formaldehyde give and addition product with methyl magnesium iodide. Which one aqueous hydrolysis gives: (a) CH_3OH (b) C_2H_5OH (c) $(CH_3)_2CHOH$ (d) non of these	B
1907)	Ketones on reaction with methyl magnesium iodide will produce: (a) Tertiary alcohol (b) primary alcohol (c) secondary alcohol (d) All of these	A
1908)	Select the suitable product when ethylene oxide react with hydrogen bromide: (a) 1-Bromethanol (b) Ethyl bromide (c) 2-Bromo ethanol (d) Ethylene glycol	C
1909)	Dry CO_2 is passed through Grignard reagent in the presence of ether as a solvent the intermediate is decomposed with dil HCL which gives the compound: (a) Primary alcohol (b) Acetone (c) Carboxylic acid (d) Secondary alcohol	C
1910)	Which one of the Grignard reaction below could give rise to $CH_3CH_2CH(OH)CH_2CH_3$ (a) Propane and methyl grignard (b) Methyl ethyl ketone and methyl	C



	grignard (c) Propanaldehyde and ethyl Grignard (d) None of these	
1911)	Choose the correct option of the following? (a) Ammonia is stronger base than Aliphatic primary amines (b) Aliphatic primary amines are stronger bases than ammonia (c) Aliphatic primary amines and ammonia have almost equal basic strength (d) Aliphatic amines are not basic in nature	B
1912)	20 Ethanal reacts with $\text{CH}_3\text{CH}_2\text{MgBr}$ the product for Med] is: (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (b) $\text{CH}_3 > \text{CHOH}$ (c) $\text{CH}_3 > \text{CHOH}$ (d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	C
1913)	Which is not true about Grignard reagent? (a) They are highly reactive compounds (b) They are very stable compounds and can be isolated easily (c) They have synthetic importance (d) They are represented by general formula RMgX .	B
1914)	Primary amines on treatment with alkyl halide yield: (a) Secondary amine (b) Tertiary amine (c) Quaternary ammonium salt (d) Mixture of (a), (b) & (c)	A
1915)	The compound which can form hydrogen bond with water is:	D



- A. $\text{CH}_3\text{-O-CH}_3$ B. $\text{CH}_3\text{-CH}_2\text{-OH}$
C. $\text{CH}_3\text{-CH}_2\text{-NH}_2$ D. Non of the above

1916)	$\text{OH}^+_{(\text{alcoholic})} + \text{CH}_3(\text{CH}_2)_2\text{Br} \rightarrow$ Product The nature of OH in the above reaction is: A) Nucleophile B) Lewis base C) Ligand D) All of the above	A	
1917)	$\text{CH}_3\text{CH}_2\text{NH}_2 + \text{C}_2\text{H}_5\text{-C-C}_2\text{H}_5 \rightarrow$ Product A. Schiff's salt B. Diazonium salt C. Amide D. Imine + Amide	A	
1918)	Which one is a strong nucleophile: A. $\text{C}_6\text{H}_5\text{-O}^-$ B. H-O^- C. NH_3 D. $\text{C}_2\text{H}_5\text{-O}^-$	A	
1919)	$\text{KOH (alcoholic)} + \text{CH}_3(\text{CH}_2)_2\text{CH}_2\text{Br (1)}$. The reactants in the condition given will under go: A. Nucleophilic substitution reaction. B. Elimination reaction. C. Nucleophilic addition. D. None of the above	B	
1920)	$(\text{CH}_3)_3\text{C-CH}_2\text{-Br}$ cannot undergo elimination reaction with alcoholic KOH. It is because. A) Alcoholic KOH is not a good choice B) It is tertiary alkyl halide C) For elimination strong base is needed D) There is no B-hydrogen in the compound		
1921)	Which of the reactant pair you think gives fastest reaction? A) $\text{CH}_3\text{-I} + \text{F}_2$ B) $\text{CH}_3\text{-Cl} + \text{F}_2$ C) $\text{CH}_3\text{-Br} + \text{Cl}_2$ D) $\text{CH}_3\text{-F} + \text{I}_2$	A	



1922)	Bromo ethane on reaction with KCN gives compound "X". the compound "X" on reduction with hydrogen (nascent) gives; A) $\text{CH}_3 - \text{CH}_3$ B) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NH}_2$ C) $\text{CH}_3 - \text{CH}_2 - \text{COOH}$ D) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NO}_2$	
1923)	an alkyne that gives aldehyde on hydrolysis with water under proper condition is: A) $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$ B) $\text{CH}_3 - \text{C} \equiv \text{CH}$ C) $\text{CH}_3 - \text{CH}_2 - \text{C} \equiv \text{C}$ D) None of the above	
1924)	Aqueous KOH causes S_N -reaction in alkyl halide. On which of the following alkyl halides KOH would like to attack easily; A) $\text{CH}_3 - \text{CH}_2 - \text{Cl}$ B) $\text{CH}_3 - \text{CH}_2 - \text{Br}$ C) $\text{CH}_3 - \text{CH}_2 - \text{F}$ D) $\text{CH}_3 - \text{CH}_2 - \text{I}$	D
1925)	Which bond is most stable? (a) $\text{C} - \text{Cl}$ (b) $\text{C} - \text{F}$ (c) $\text{C} - \text{Br}$ (d) $\text{C} - \text{I}$	(b) The bond energies order is $\text{C} - \text{F} > \text{C} - \text{Cl} > \text{C} - \text{Br} > \text{C} - \text{I}$. the strength of bonds i.e. the bond stability order is $\text{C} - \text{F} > \text{C} - \text{Cl} > \text{C} - \text{Br} > \text{C} - \text{I}$
1926)	With the increase in size of halogen atom the reactivity of an alkyl halide (a) increase (b) decreases (c) Remain constant (d) None of these	(a) With the increase in the size of the halogen atom the bond energy decreases and hence the reactivity of alkyl halide increases order of reactivity is $\text{R} - \text{I} > \text{R} - \text{Br} > \text{R} - \text{Cl} > \text{R} - \text{F}$
1927)	Which is the major failure towards the reactivity of an alkyl halide (a) Bond energy (b) Bond polarity (c) Bonding time (d) None of these	(b) Due to greatest electronegativity difference between F and C, the bond is strongly polar and $\text{C} - \text{I}$ bond is least polar. Then alkyl fluoride should be highly reactive due to attack of electrophiles. But actually $\text{R} - \text{I}$ is highly reactive and $\text{R} - \text{F}$ is least reactive. It is contradictory to bond polarity.



1928)	Which is not a nucleophile (a) OH^- (b) $\text{C}_2\text{H}_5\text{O}^-$ (c) SCN^- (d) None of these	(d)	Nucleophile contains an unshared electron pair and all the three have unshared electron pairs.
1929)	Which is a weak nucleophile (a) OH^- (b) Br^- (c) NH_3 (d) Cl^-	(d)	For halide ions the order of nucleophilic strength is $\text{I}^- > \text{Br}^- > \text{Cl}^-$. And when NH_3 reacts with an alkyl halide it displaces the halide ion. It means NH_3 is a stronger nucleophile than the halide ions. Therefore Cl^- is a weak nucleophile.
1930)	Which is a good nucleophile as well as a good leaving group (a) F^- (b) Cl^- (c) Br^- (d) I^-	(d)	For halide ions the order of nucleophilic strength is $\text{I}^- > \text{Br}^- > \text{Cl}^- > \text{F}^-$. But at the same time I^- is a good leaving group.
1931)	An electrophile may be (a) Positive (b) Negative (c) Neutral (d) Both c and a	(d)	Electrophile is a species which attracts electrons. It may be a neutral having partial positively charged centre like $\text{CH}_3 - \text{CH}_2 - \text{Br}$ or it may be positively charged like a carbocation R_3C^+ .
1932)	A nucleophile may be (a) Positive (b) Negative (c) Neutral (d) Both c and a	(d)	A nucleophile contains an unshared electron pair on it. It may be a neutral molecule or a negative ion e.g. NH_3 , H_2O are neutral and act as nucleophiles OH^- , I^- , CN^- etc. also act as nucleophiles.
1933)	The alkyl halide molecule on which a nucleophile attacks is called (a) Substrate (b) Substituent (c) Substituted (d) All of these	(a)	The alkyl halides are electrophilic centres on which a nucleophile attacks and makes a new covalent bond with it. The centre on which nucleophile attacks is called substrate.
1934)	In $\text{R} - \text{X}$ the 'R' can not be (a) Alkane (b) Saturated hydrocarbon (c) Aromatic (d) Aliphatic	(c)	$\text{R} - \text{X}$ is an alkyl halide i.e. monohalo alkane. It means the R is an alkyl group with general formula $\text{C}_n\text{H}_{2n+1}$ and it cannot be aromatic.
1935)	Elimination reactions are usually _____ catalyzed (a) Acid (b) Base	(b)	It is the base which attacks on the B - H of alkyl halide forming alkene. $\text{B} + \text{H} - \text{C}^{\text{B}}\text{H}_2 - \text{CH}_2 - \text{Br} \rightarrow$



	(c) Pt	(d) Ni	
1936)	Primary alkyl halides follow (a) E ₁ mechanism (b) E ₂ Mechanism (c) Both E ₁ and E ₂ (d) None of these	(b)	alcoholic H₂O = CH₂ + B⁺H + Br⁻. The nucleophile attacks upon B – H of P-alkyl halide the halogen leave at the same time with the formation of C = C double bond. It is one step elimination and its rate = k [base] [R – X] is bimolecular called E² elimination.
1937)	E ₁ mechanism is generally shown by (a) 1° – RX (b) 2° – RX (c) 3° – RX (d) none of these	(c)	Ter-alkyl halides undergo ionization in the first step to give a carbocation. $\begin{array}{ccc} \text{CH}_3 & & \text{CH}_3 \\ & & \\ \text{CH}_3 - \text{C} - \text{Br} & & \text{H}_3\text{C} - \text{C}^+ \\ & & \\ \text{CH}_3 & & \text{CH}_3 \end{array}$ $+ \text{Br}^-$ OH⁻ + H – CH₂ – C⁺ → $\begin{array}{ccc} \text{CH}_3 & & \text{CH}_3 \\ & & \\ \text{H}_2\text{C} = \text{C} & + & \text{H}_2\text{O} \\ & & \\ \text{CH}_3 & & \text{CH}_3 \end{array}$ Rate = k[R – X] it is unimolecular elimination base cannot attack the B—H in first step due to steric hindrance.
1938)	Both E ₁ and E ₂ mechanism can be shown by (a) 1° – RX (b) 2° – RX (c) 3° – RX (d) none of these	(b)	Sec-Alkyl halides can give E¹ or E² reactions under the given condition polar solvents favour ionization step, giving E¹ reaction. But non-polar solvents favour E² reaction of 2°-alkyl halide.
1939)	Generally the reactions of alkyl halides fall into (a) Substitution (b) Elimination (c) Both a and b (d) None of these	(c)	During nucleophilic substitution reactions, the attacking nucleophile attacks the electrophilic carbon atom of the alkyl halide. But the same time the nucleophile also attacks the electrophilic H—atom attached to the B-carbon of alkyl halide, removing this H and forms and alkene.



1940)	The general formula of alkyl halides is (a) $C_nH_{2n}X$ (b) $C_nH_{2n-1}X$ (c) $C_nH_{2n+1}X$ (d) $C_nH_{2n-2}^X$	(c)	Alkyl halides are more halo alkanes i.e. one H-atom of alkane is replaced by the halogen atom. General formula of alkane is C_nH_{2n+2} . After removal of one H-atom by x-atom becomes $C_nH_{2n+1} - X$
1941)	The order of stability 1° , 2° and 3° alkyl halides is (a) $1^\circ > 2^\circ > 3^\circ$ (b) $2^\circ > 1^\circ > 3^\circ$ (c) $3^\circ > 1^\circ > 2^\circ$ (d) $3^\circ > 2^\circ > 1^\circ$	(d)	The general order of stability is tertiary > secondary > primary. This order of stability is greater for tertiary alkyl halides as these have greater no. of hyper-conjugation structures.
1942)	The rate determining step in the S_N1 reaction is (a) Carbonium ion formation (b) Product formation (c) nucleophilic attack (d) none	(a)	$\begin{array}{ccc} \text{CH}_3 & & \text{CH}_3 \\ & & \\ \text{CH}_2 - \text{C} - \text{Br} & \xrightarrow{\text{slow}} & \text{H}_3\text{C} - \text{C}^+ + \text{Br}^- \\ & & \\ \text{CH}_3 & & \text{CH}_3 \\ \text{(Carbonium ion)} & & \\ \text{CH}_3 & & \text{CH}_3 \\ & & \\ \text{Nu} + \text{H}_3\text{C} - \text{C} & \xrightarrow{\text{fast}} & \text{H}_3\text{C} - \text{C} - \text{Br}^- \\ & & \\ \text{CH}_3 & & \text{CH}_3 \end{array}$ $\text{Rate} = k[\text{R}_3\text{C} - \text{X}]$
1943)	When $\text{R} - \text{OH}$ reacts with $\text{H} - \text{X}$ then the product will be (a) $\text{R} - \text{X}$ (b) water (c) both a and b (d) none	(c)	$\text{R} - \text{OH} + \text{H} - \text{X} \rightarrow \text{R} - \text{X} + \text{H}_2\text{O}$
1944)	Which is more reactive (a) $\text{R} - \text{I}$ (b) $\text{R} - \text{Br}$ (c) $\text{R} - \text{Cl}$ (d) $\text{R} - \text{OH}$	(a)	Order of reactivity of alkyl halides on the basis of their bond energy is $\text{R} - \text{I} > \text{R} - \text{Br} > \text{R} - \text{Cl} > \text{R} - \text{F}$. $\text{C} - \text{I}$ has lowest bond energy.
1945)	When Grignard's reagent reacts with acetone it gives (a) 1° - alcohol (b) 2° - alcohol (c) 3° - alcohol (d) all of these	(c)	$\begin{array}{c} \text{CH}_3 \\ \\ \text{R} - \text{Mg} - \text{X} + \text{H}_3\text{C} - \text{C} = \text{O} \\ \\ \text{CH}_3 \end{array} \rightarrow \begin{array}{c} \text{CH}_3 \\ \\ \text{R} - \text{C} - \text{OH} \\ \\ \text{CH}_3 \end{array}$
1946)	Monohalo derivatives of alkanes are called (a) Chloroalkanes	(b)	These have general formula $\text{R} - \text{X}$ or $\text{C}_n\text{H}_{2n+1}\text{X}$.

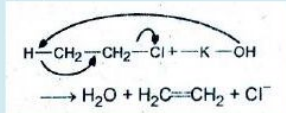


	(b) Alkyl halides (c) Aromatic halides (d) None of these	
1947)	The formula of thionyl chloride is (a) COCl_2 (b) SOCl_2 (c) SOCl_2 (d) None	(c) SOCl_2 is the formula.
1948)	In Wurtz's reaction the metal used is (a) Zn (b) Ag (c) Na (d) None	(c) $\text{CH}_3 - \text{Br} + 2\text{Na} + \text{CH}_3 - \text{Br} \rightarrow$ $\text{CH}_3 - \text{CH}_3 + 2\text{NaBr}$ Symmetrical alkanes are formed by this method.
1949)	The elimination of elements of H and X from two adjacent C-atoms is called (a) Dehalogenation (b) Dehydrohalogenation (c) Dehydrogenation (d) All	(b) Removal of hydrogen and halogen is called dehydrohalogenation.
1950)	Ethyl bromide + ammonia $\rightarrow$ Ethyl amine + HBr, this reaction is called (a) Wurtz's reaction (b) Ammonolysis (c) Both a and b (d) None	(b) $\text{CH}_3 - \text{CH}_2 - \text{Br} + \text{NH}_3 \rightarrow$ $\text{CH}_3 - \text{CH}_2 - \text{NH}_2 + \text{HBr}$ As it is substitution of amino group into the alkyl carbon called ammonolysis.
1951)	Nucleophile generally attack the site of molecule which is (a) Electron rich (b) Electron deficient (c) Bonded (d) All of these	(b) Nucleophile means nucleus loving and it attacks upon a centre where positive or partially positive charge is present.
1952)	The $\text{S}_\text{N}1$ reaction is generally give by (a) $1^\circ \text{R} - \text{X}$ (b) $2^\circ \text{R} - \text{X}$ (c) $3^\circ \text{R} - \text{X}$ (d) All of these	(c) $3^\circ \text{R} - \text{X}$ (Ter-alkyl halides) undergo ionization in first step. $\text{R} \quad \text{R}$ $\text{R} - \text{C} - \text{X} \text{ (slow)} \rightarrow \text{R} - \text{C}^+ + \text{X}^-$



		$\begin{array}{c} \text{R} \quad \text{R} \\ \quad \\ \text{R} \quad \text{R} \\ \text{OH}^- + \text{R}-\text{C}^+ \text{ (fast)} \rightarrow \text{R}-\text{C}-\text{OH} \\ \quad \\ \text{R} \quad \text{R} \end{array}$ Rate = $k[\text{R}_3\text{C}-\text{X}]$ it is unimolecular nucleophilic substitution. Primary carbocation is least stable, so P-alkyl halides do not give $\text{S}_\text{N}1$ reaction.
1953)	$\text{S}_\text{N}2$ reaction is _____ step (a) Uni (b) BI (c) Multi-- (d) All of these	(a) The attacked of nucleophile on alkyl halide and breaking of C – X bond is simultaneous in a single step. $\text{OH}^- + \text{H}_3\text{C}-\text{CH}_2-\text{Br} \rightarrow (\text{slow}) \text{OH}-\text{CH}_2-\text{CH}_3 + \text{Br}^-$
1954)	The transition state is formed in the (a) $\text{S}_\text{N}1$ (b) $\text{S}_\text{N}2$ (c) Both a and b (d) None of these	(b) The intermediate formed in which old bonds start breaking and new bonds start forming is called transition state which is formed in $\text{S}_\text{N}2$ reaction. $\begin{array}{c} \text{H} \\ \\ \text{OH}^- + \text{H}-\text{C}^{+\text{g}}-\text{B}^{-\text{g}} \rightarrow \\ \quad \\ \text{H} \quad \text{H} \\ \text{HO}-\text{C}-\text{br} \\ \quad \\ \text{H} \quad \text{H} \\ \text{HO}-\text{C}-\text{H} + \text{Br} \\ \\ \text{H} \end{array}$ Transition state.
1955)	Elimination reaction is (a) E_1 (b) E_2 (c) Both a and b (d) None of these	(c) Like $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ the alkyl halide, also under E^1 and E^2 reactions because when nucleophile attack upon B – H of alkyl halide then alkane formed
1956)	Grignard's reagent is (a) An organic compounds (b) An organo-metallic	(b) It is $\text{R}-\text{Mg}-\text{X}$ thus an organic metallic compound.



compound	
(c) An inorganic compound	
(d) None	
1957) By reacting Grignard's reagent with the HCHO we get	(a) $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{R}-\text{MgX} + \text{H}-\text{C}=\text{O} \rightarrow \text{R}-\text{C}-\text{OH} \\ \\ \text{H} \\ \text{P-alcohol} \end{array}$
(a) 1°-alcohol (b) 2°-alcohol	
(c) 3°-alcohol (d) all of these	
1958) The best way to get alkanes from the Grignard's reagent is by reacting with	(c) $\begin{array}{c} \text{X} \\ \\ \text{R}-\text{MgX} + \text{H}-\text{OH} \rightarrow \text{R}-\text{H} + \text{Mg} \\ \\ \text{OH} \end{array}$
(a) Benzene (b) R—X	
(c) water (d) None of these	
1959) By reaction of Grignard's reagent with the ammonia we get	(a) $\begin{array}{c} \text{NH}_2 \\ \\ \text{R}-\text{Mg}-\text{X} + \text{H}-\text{NH}_2 \rightarrow \text{R}-\text{H} + \text{Mg} \\ \\ \text{O} \end{array}$
(a) Alkanes (b) Ethane	
(c) Methane (d) None of these	
1960) When carbon dioxide is passed through the R—Mg—X is produced	(a) $\begin{array}{c} \text{NH}_2 \\ \\ \text{R}-\text{Mg}-\text{X} + \text{H}-\text{NH}_2 \rightarrow \text{R}-\text{H} + \text{Mg} \\ \\ \text{O} \end{array}$
(a) Any carboxylic acid	
(b) Propanoic acid	
(c) Propanedioic acid	
(d) None of these	
1961) The reaction in which the an atom or group is replaced by another atom or group is called	(a) $\begin{array}{c} \text{O} \\ \\ \text{R}-\text{C}-\text{O}^+\text{MgX} \rightarrow \text{R}-\text{COH} \end{array}$
(a) Substitution (b) Elimination	
(c) Both a and b (d) None	
1962) _____ is produced by the reaction of ethyl chloride with alc — KOH	(a) A reaction in which an atom or a group is replace by another atom or a group is called substitution.
(a) Ethanol (b) Ethene	
(c) Ether (d) Acetylene	
	
1963) In general the reactions of	(b) Anhydrous condition are essential in



grignard's reagents are carried out in

- (a) Acetone (b) Ether
(c) Pyridine (d) n-hexane

reactions involving Grignard reagent. Usually ether is the solvent. In presence of water G. R. reacts to form alkane.

1964)	_____ is called a synthetic tool in the hand of a chemist (a) Ethyl alcohol (b) sulfuric acid (c) Benzene (d) Grignard's reagent	(d)	R – MgX is very useful in the synthesis of various organic compounds, so it is a synthetic tool for synthesis of many organic compounds like alkanes, alcohols, alkyl cyanides, amines, carboxylic acids etc.
1965)	Which alkyl halides react most readily by SN reactions? (A) CH_3CH_2Cl (B) CH_3CH_2I (C) CH_3CH_2Br (D) CH_3CH_2F	B	I ⁻ is good leaving group, less electronegative (C – I) bond and the bond (C – I) have low bond energy. So, it mostly readily undergoes SN reaction.
1966)	RMgX do not shown any reaction with (A) Water (B) Alkanones (C) Alkane (D) CO_2	C	Alkanes are not H-active compound. They did not give proton to Grignard reagent.
1967)	Which one of the following can form hydrogen bond with water? (A) CH_3Cl (B) CH_3Br (C) CH_3I (D) None of these	D	For hydrogen bonding partial +ve ($H^{\delta+}$) and more electronegative atoms (like F, O, N) is needed
1968)	Which of the following is a gas at room temperature? (A) CH_3Cl (B) C_2H_5Cl (C) C_3H_7Cl (D) All of these	D	Alkyl halide from C_1 upto C_3 are gases at room temperature. From C_4 to C_{18} are colourless liquids while beyond C_{18} are colourless solid.
1969)	Which one is denser than water? (A) Alkyl chloride (B) Alkyl fluoride (C) Alkyl bromide (D) None of these	C	Density depends on mass per unit volume. Alkyl chloride and alkyl fluoride are lighter than water while alkyl bromide is denser.
1970)	Which one of the following favours	D	Elimination reaction proceed through



	elimination reaction? (A) High temperature (B) Greater steric hindrance (C) Low temperature (D) Both a and b		high temperature because it is endothermic reaction. Greater the steric hindrance more will be the chances of elimination rather than SN mechanism.
1971)	Alkyl halides can be prepared from alcohols by reaction with: (A) Halogen acids (B) Phosphorus halides (C) Thionyl chlorides (D) All of these	D	All of these can be used to form alkyl halides
1972)	The reactivity of alkyl halides depends upon the strength of carbon – halogen bond. Pick up the most reactive alkyl halide of the following: (A) Alkyl fluoride (B) Alkyl chloride (C) Alkyl bromide (D) Alkyl iodide	D	The reactivity of alkyl halide depends on (1) Strength of carbon halogen bond, (2) Both length (3) Bond dissociation energy. Higher the polarity and strength of carbon halogen bond lessens will be the reactivity. Thus $R-I > R-Br > R-Cl > R-F$
1973)	Which of the following is used as anesthetic agent in anesthesia? (A) $R-X$ (B) Aldehyde (C) Ketone (D) All of these	A	Alkyl halide is used as anesthetic agent in anesthesia.
1974)	Which one has highest boiling point? (A) $R-F$ (B) $R-Cl$ (C) $R-Br$ (D) $R-I$	D	The molecular weight of $R-I$ is more as compared thus it has more intermolecular attractive forces and hence high boiling points.
1975)	Alkyl halides are soluble in water (A) Slightly (B) Highly (C) Not soluble (D) Some slightly some highly	A	Alkyl halides are slightly soluble in water because water is polar and inorganic alkyl halide is also polar but organic and it cannot form hydrogen bonds with water thus slightly soluble.
1976)	For which mechanisms, the 1 st step involved is the same (A) E_1 and E_2	D	1 st step is slow for both SN^1 and E^1 mechanism. The ionization of C-Nu bond occur in a single step.



	(B) E_2 and SN^2 (C) E_1 and SN^2 (D) E_1 and SN^1		
1977)	Among the following the single step mechanism: (A) E^1 (B) SN^1 (C) SN^2 (D) Both a and b	B	In SN^2 mechanism, the rate depends on concentration of reactant and reagent. Rate = $K[Nu][R - X]$
1978)	Which one is 2 nd order kinetics? (A) SN^1 (B) SN^2 (C) E^1 (D) Both a and c	B	In SN^1 the breaking of C – X bond and the formation of C – Nu bond occur one after the other in two different steps.
1979)	SN_1 is _____ step reaction (A) 1 (B) 2 (C) 3 (D) 4	C	In case of tertiary alkyl halides the nucleophile attacks the carbon which is crowded. So, this reaction will occur in 2 steps. In first step a stable carbocation is formed where leaving group leaves the carbon and then it is attacked by nucleophile so SN_1 reaction is favored in case of tertiary alkyl halide.
1980)	Which alkyl halide undergoes SN_1 mechanism? (A) Primary (B) Secondary (C) Tertiary (D) All of these	A	SN_1 mechanism is favoured by polar solvent. Tertiary alkyl halide is ionized by polar solvent to form tertiary carbocation in slow step.
1981)	Which reactions are favoured by polar solvents? (A) SN^1 (B) E^1 (C) SN^2 (D) Both a and b	C	Secondary alkyl halide gives SN_1 reaction in polar protic solvent while SN_2 mechanism is followed if the solvent is polar aprotic.
1982)	Secondary alkyl halide may follow SN^1 or SN^2 mechanism, depending upon the nature of: (A) Leaving group (B) Nucleophile (C) Solvent (D) All of these	C	Secondary alkyl halides give SN_1 reaction in polar protic solvent while SN_2 mechanism is followed if the solvent is polar aprotic.
1983)	The general formula of Grignard	C	The general formula of Grignard's



reagent is

- (A) RMgX
- (B) ArMgX
- (C) Both of them
- (D) RX

reagent is ArMgX , RMgX where Ar is aryl and R is alkyl.

1984)	Which one is organometallic compound? (A) $(\text{CH}_3)_4\text{Pb}$ (B) $(\text{C}_2\text{H}_5)_4\text{Pb}$ (C) CH_3MgCl (D) All of them	D	Organometallic compound has polar covalent bond between carbon and metal in organic compound.
1985)	Grignard reagent is used for preparation of (A) Alkanes (B) Alcohol (C) Carboxylic acid (D) All of these	D	It produces large number of organic compounds like alcohol, carboxylic acid, ketones, alkyl halide, alkane etc. therefore Victor Grignard was awarded by a noble prize.
1986)	Iodine is a best leaving group because of (A) High polarizability (B) Low bond energy (C) Both a and b (D) None	C	Iodine is a good nucleophile because of high polarizability and has low bond energy it can leave the molecule easily.
1987)	Which one of the following does not form Grignard's reagent? (A) CH_3I (B) CH_3Br (C) CH_3F (D) CH_3Cl	C	F reduces the nucleophilicity of nucleophile carbon in Grignard reagent because of its high electronegativity that is why CH_3F cannot be used to form Grignard's reagent.
1988)	Which amine does not react with acid halides? (A) Tertiary amine (B) Secondary amine (C) Primary amine (D) None of these	A	Primary and secondary amine can react with acid halides because they contain hydrogen attached to nitrogen while tertiary amine cannot react with acid halide because nitrogen lacks replicable hydrogen.
1989)	Base and a nucleophile are differentiated by their actions as a. A base attacks on the C during elimination reactions b. A base attacks on the H during substitution reactions c. A base attacks on H in elimination reactions		



d. A base attack on c during substitution reactions

1990)	The stability of the carbocations is in the following order a. $R_3C^+ > R_2CH^+ > RCH_2^+$ b. $RCH_2^+ > R_2CH^+ > R_3C^+$ c. $R_3C^+ > R_2CH^+ > RCH_2$ d. $R_2CH^+ > RCH_2^+ > R_3C^+$	A	
1991)	Which alkyl halide undergoes elimination reaction easily? a. Pri-Alkyl halide b. Sec-Alkyl halide c. Ter-Alkyl halide d. All of the above	C	
1992)	All bases are nucleophiles. Their strength decide the type of reaction either to be elimination or substitution. A weak base favours a. Elimination reaction b. Substitution reaction c. Both a and b d. None of the above	B	
1993)	A tertiary alkyl halide is reacted with KOH in water. The type of reaction will be a. SN3 b. SN1 c. E2 d. E1	B	
1994)	Which one is Grignard's reagent? a. Tetra ethyl lead b. Methyl lithium c. Methyl magnesium bromide d. Etyhyl lithium	C	
1995)	Tetraethyl lead is a. Inorganic compound b. Grignard reagent c. Organic compound d. Organo metallic compound	D	
1996)	Which Grignard Reagent can be easily prepared? a. Ethyl magnesium iodide	D	



- b. N-propyl magnesium iodide
- c. Isopropyl magnesium iodide
- d. Emthyl magnesium iodide

1997) Which one is easily prepared? A

- a. Ethyl magnesium iodide
- b. Ethyl magnesium chloride
- c. Ethyl magnesium bromide
- d. All require same condition

1998) The treatment of CH_3MgX with D
 $\text{CH}_3\text{C}=\text{C}-\text{H}$ produces

- a. $\text{CH}_3-\text{C}=\text{CH}_2$
- b. $\text{CH}_3\text{C}=\text{C}-\text{CH}_3$
- c. $\text{CH}_3-\text{C}(\text{H})=\text{C}(\text{H})-\text{CH}_3$
- d. CH_4

1999) In R-Mg-X the bond between Mg C
and halogen is

- a. None polar covalent
- b. More covalent
- c. More ionic
- d. Coordinate covalent.

2000) Which one of the following species A
readily reacts with grignard's
reagent?

- a. RI
- b. RCI
- c. RBr
- d. RF

2001) Which one of the following D
compounds does not form alcohol
on reaction with Grignard's reagent?

- a. Formaldehyde
- b. Acetaldehyde
- c. Acetone
- d. CO_2

2002) Which one of the following can be D
used as grignard's reagent?

- a. $\text{C}_2\text{H}_5-\text{Mg}-\text{Br}$
- b. $\text{C}_6\text{H}_5-\text{Mg}-\text{Cl}$
- c. $\text{C}_6\text{H}_5-\text{Mg}-\text{I}$
- d. All of the above

2003) Which of the following would not A
be a reasonable nucleophile in a



SN₂ reaction?

- a. $^+\text{NH}_4$
- b. NC^-
- c. X^-
- d. HO^-

2004) Which one of the following bonds A has highest bond energy?

- a. C–F
- b. C–Cl
- c. C–Br
- d. C–I

2005) Which one of the following is best C nucleophile?

- a. Cl
- b. Br
- c. I
- d. F

2006) Which one of the following is not a A nucleophile?

- a. CH_3^+
- b. SCH^-
- c. $\text{C}_2\text{H}_5\text{O}^-$
- d. NH_3

2007) During SN₂ mechanism, the B nucleophile attacks on the substrate

- a. After C–X bond has broken
- b. Before C–X bond has broken
- c. After C–H bond has broken
- d. After the formation of carbocation

2008) N the 1st step of SN₁ reactions the D hybridization of carbon changes from

- a. $\text{sp} \rightarrow \text{sp}^3$
- b. $\text{sp}^3 \rightarrow \text{sp}^3$
- c. $\text{sp}^3 \rightarrow \text{sp}$
- d. $\text{sp}^3 \rightarrow \text{sp}^2$

2009) What is the order of kinetics in SN₁ B reactions?

- a. Zero
- b. First
- c. Second



d. Third

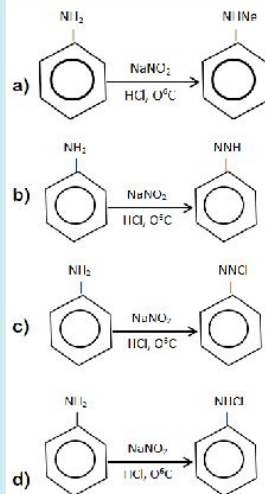
- 2010) In elimination reactions of alkyl halides, the more susceptible site of attack is
- A-carbon
 - B-carbon
 - Y-carbon
 - Beta hydrogen

2011)

CHAPTER 18:

ALCOHOLS, PHENOLS AND ETHERS

- 2012) Choose the correct reaction



- 2013) Four beakers containing ethanol, ethanol, propanone and phenol separately. Aqueous bromine was added to each beaker. A white ppt was produced in one beaker. This beaker contain:

B



- A) Ethanol B) Phenol
C) Ethanal D) Propanon

2014)	Select the correct order in boiling point: 2017- Eng A. 1-Butanol < 2-Butanol < 2-Methyl-2-Propanol B. 2-Butanol < 1-Butanol < 2-Methyl-2-Propanol C. 2-Methyl-2-Propanol < 1-Butanol < 2-Butanol D. 2-Methyl-2-Propanol < 2-Butanol < 1-Butanol	D
2015)	Choose the suitable catalyst for the following reaction: $\text{ROH} + \text{HCl} \rightarrow \text{RCl} + \text{H}_2\text{O}$ A) AlCl_3 B) ZnCl_2 C) TiCl_4 D) FeCl_3	B
2016)	Diethyl ether reacts with Acetyl Chloride in the presence of anhydrous ZnCl_2 to form: A. $\text{C}_2\text{H}_5\text{Cl} + \text{CH}_3\text{COOC}_2\text{H}_5$ B. $\text{CH}_2=\text{CH}_2 + \text{CH}_3\text{COOC}_2\text{H}_5 + \text{HCl}$ C. $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5 + \text{Cl}_2$ D. None of the above	A
2017)	Methane Thiol and ethane Thiol is added to the natural gas: A) To make combustion of natural gas very easy B) To increase the boiling point C) To detect the gas leakage by smell D) Both a and c	C
2018)	The correct product of the complete reduction of propionic acid is; $\begin{array}{c} \text{O} \\ \\ \text{CH}_3\text{-CH}_2\text{-C-OH} \end{array} \xrightarrow[\text{ether}]{\text{LiAlH}_4}$ A) $\text{CH}_3\text{-CH}_2\text{-C-CH}_2$ B) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-OH}$ C) $\text{CH}_3\text{-COH}$ D) $\text{CH}_3\text{-CH}_2\text{-OH}$	



2019)	2- Bromopropene on reaction with $C_2H_5S^-$ thio alcohol under goes: A) Elimination reaction B) Substitution reaction C) No reaction because $C_2H_5S^-$ is a stronger base D) Addition reaction		
2020)	The oxidation number of carbon in $Mg(HCO_3)_2$ is: A) +4 B) -4 C) -2 D) Zero	A	
2021)	The alcohol given $CH_3-CH_2-(CH_3)_2-OH$. If oxidized with a strong oxidizing agent given: 20181-Med A) Aldehyde B) Ketone C) Ether D) None of the above	D	
2022)	The non-carbonyl compound out of the following is: 2018-Med A) $CH_3-CO-CH_3$ OH B) $C_2H_5-CH-CH_3$ NH ₂ C) $CH-C=O$ OR D) $CH_3-C=O$	B	
2023)	Excess of ethanol is heated with conc: sulphuric acid keeping the temperature $140^\circ C$. The product for Med is: A) $C_2H_5OC_2H_5 + H_2O$ B) C_2H_4 C) C_2H_5OH D) C_2H_6		
2024)	Ethanol is manufactured by fermentation of starche. The starch conversion to maltose requires the enzyme; (a) zymase (b) invertase	c	



	(c) diatase (d) all		
2025)	Rectified spirit is: (a) 100% ethanol (b) 95% ethanol (c) 90 % ethanol (d) 35% ethanol	b	
2026)	Which compounds has heighest B. Point? 2009-08 Med : (a) C ₂ H ₆ (b) C ₂ H ₅ Cl (c) CH ₃ OCH ₃ (d) C ₂ H ₅ OH	d	
2027)	Which one of the following will give an ionic product? (a)CH ₃ CH ₂ OH + PCI ₅ → (b)CH ₃ CH ₂ OH + Na → (c)CH ₃ CH ₂ OH + PCI ₃ → (d) CH ₃ CH ₂ OH + 5oCl ₂ →	b	
2028)	6. Mehtanol reacts with sodium. The product for Med] is sodium methoxide and hydrogen gas. $2\text{CH}_3\text{OH} + 2\text{Na} \rightarrow \text{CH}_3\text{O Na} + \text{Na} + \text{H}_2 \text{ (g)}$ In this re action methanol acts as: (a) Weak base (b) Weak acid (c) Strong base (d) Weak oxidizing agent	b	
2029)	Select the compound that will not be easily oxidized: (a) Primary Alcohol (b) Sec: Alcohol (c) Ter: Alcohol (d) Aldehyde	c	
2030)	Which one of the following will not undergo dehydrogenation? (a) CH ₃ OH (b) (CH ₃) ₂ CHOH (c) (CH ₃) ₃ COH (d) CH ₃ CH ₂ OH	c	
2031)	Lucas Test is used to detect the presence of: (a) Alcohols (b) Phenols (c) Amino acids (d) Carboxylic acids	A	



2032)	The compound which reacts most readily with lucas reagent is: (a) $\text{CH}_3\text{CH}_2\text{Cl}$ (b) $(\text{CH}_3)_2\text{CHOH}$ (c) $\text{CH}_3\text{CH}_2\text{OH}$ (d) $(\text{CH}_3)_3\text{COH}$	D
2033)	Lucas reagent is: (a) $\text{HCl} / \text{NaNO}_2$ (b) H_2 / Pb (c) $\text{HCl} / \text{ZnCl}_2$ (d) $\text{HCl} / \text{HNO}_3$	C
2034)	By reacting phenol with bromine water the product obtained is. (a) O-bromophenol (b) M-bromophenol (c) P-bromophenol (d) 2,4,6-tribromophenol	D
2035)	Bakelite is obtained from: (a) Adipic acid and hexamethylenediamine (b) Dimethyl terephthalate and ethyl glycol (c) Neoprene (d) Phenol and formaldehyde	D
2036)	Choose the compound in which hydrogen bonding is not possible? (a) CH_3OCH_3 (b) H_2O (c) $\text{CH}_3\text{CH}_2\text{OH}$ (d) CH_3COOH	A
2037)	Ethers are considered as: (a) lewis acids (b) lewis bases (c) both a & b (d) None of these	B
2038)	$\text{CH}_3\text{COCl} + 2\text{NH}_3 \rightarrow$ Considering the above reaction which one is the true product? (a) $\text{CH}_3\text{COO NH}_4$ (b) $\text{CH}_3\text{CO NH}_2$ (c) $\text{H}_2\text{N COO NH}_4$ (d) CH_3Cl	B
2039)	Which of the following compounds will react with methyl magnesium Iodide followed by acid hydrolysis	D



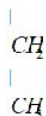
to give ethyl alcohol?

- a) Ethylene b) Acetone
c) Acetaldehyde d) Formaldehyde

2040) Which of the following compounds does not give iodoform test on reaction with I_2 and $NaOH$? **D**

a) Propanone b) Ethanol
c) Butanone d) 2-Propanol

2041) IUPAC name of the compound $CH_3-CH-CH_2CH(OH)-CH_3$. **C**



- (a) 4-methyl-3-hexanol
(b) Heptanol
(c) 4-methyl-2-hexanol
(d) 4-ethyl pentanol-2

2042) Hemiacetal containing both; **B**

A) Alcohol and aldehyde functional groups
B) Alcohol and ether functional groups
C) Aldehyde and ether functional groups
D) Alcohol and carboxylic acid functional groups

2043) Alcohols are weakly acidic with K_a values in the range of: **D**

(a) 10^{-8} to 10^{-10} (b) 10^{-10} to 10^{-12}
(c) 10^{-12} to 10^{-25} (d) 10^{-16} to 10^{-18}

2044) Grain spirit is: **D**

(a) Isopropyl alcohol (b) Isobutyl alcohol
(c) n-propyl alcohol (d) Ethyl alcohol

2045) Lucas reagent is: **D**

(a) H_2/Pb (b) $HCl/NaNO_2$
(c) $HCl/NaNO_3$ (d) $HCl/ZnCl_2$



- 2046) 28 Methanethiol and ethanethiol is added to the natural gas: C
(a) To make the combustion of natural gas very easy
(b) To increase the boiling point
(c) to detect the gas leakage by smell
(d) Both (a) & (b)
- 2047) Which one of the following is carbolic acid? C
(a) H_2CO_3 (b) 5% solution of benzoic
(c) 5% solution of phenol
(d) 5% solution lactic acid
- 2048) Choose reaction that is not correct? D
(a) $\text{R}-\text{OH} + \text{SOCl}_2 \rightarrow \text{R}-\text{Cl} + \text{HCl} + \text{SO}_2$
(b) $\text{R}-\text{OH} + \text{PCl}_5 \rightarrow \text{R}-\text{Cl} + \text{HCl} + \text{POCl}_3$
(c) $2\text{CH}_3\text{COOH} + \text{P}_2\text{O}_5 \rightarrow \text{CH}_3\text{C}-\text{O}-\text{CCH}_3 + \text{H}_2\text{O}$
(d) $\text{CH}_3-\text{C}-\text{OH} + \text{C}_2\text{H}_5\text{Cl} \rightarrow \text{CH}_3-\text{C}-\text{Cl} + \text{C}_2\text{H}_5\text{OH}$
- 2049) Choose reaction that does not require ZnCl_2 catalyst: D
(a) $\text{CH}_3\text{CH}_2\text{OH} + \text{HCl} \rightarrow \text{CH}_3\text{CH}_2\text{Cl} + \text{H}_2\text{O}$
(b) $\text{CH}_3\text{CH}_2\text{OH} + \text{HBr} \rightarrow \text{CH}_3\text{CH}_2\text{Br} + \text{H}_2\text{O}$
(c) $\text{CH}_3\text{CH}_2\text{OH} + \text{HI} \rightarrow \text{CH}_3\text{CH}_2\text{I} + \text{H}_2\text{O}$
(d) Both (b) & (c)
- 2050) Ethoxy ethane when treated with conc: H_2SO_4 , it produces:
(a) Carbocation (b) Oxonium ion
(c) Carbanion (d) Oxalate ion
- 2051) Which of the following are considered as derivatives of water? (a) All these have their structures close to water.
(a) alcohol (b) Phenol



(c) Ether (d) All of these

2052)	Which of the following is an example of trihydric alcohol? (a) Methanol (b) Glycol (c) Glycerol (d) None of these	(c)	A trihydric alcohol has such structure i.e. $\text{CH} - \text{CH} - \text{CH}_2$ $\text{OH} \quad \text{OH} \quad \text{OH}$
2053)	The nature of alcohol (i.e. primary, secondary and tertiary) depends upon nature of _____ group (a) R (b) OH (c) Both a and b (d) None of these	(a)	It is the R which may be primary, secondary or tertiary alkyl radical Primary R = $\text{CH}_2 - \text{CH}_2 -$ $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 -$ etc. Secondary R = $\text{CH}_3 - \text{CH} -$ CH_3 $\text{CH}_3 - \text{CH}_2 - \text{CH} -$ etc. CH_2 CH_3 Tertiary R = $\text{CH}_3 - \text{C} -$ etc. CH_3
2054)	Which of the following has minimum hydrogen bonding? (a) Water (b) Alcohol (c) Ether (d) Phenol	(c)	Ether (R - O - R) do not shown hydrogen bonding with one another as these have no H-atom bonded to oxygen but they show weak hydrogen bonding with water, alcohol molecules.
2055)	Alcohol may be (a) saturated (b) Unsaturated (c) Both a and b (d) None	(c)	Saturated alcohol in which alkyl group has all carbons saturated like $\text{H}_3\text{C} - \text{CH}_2 - \text{OH}$. Unsaturated alcohol = $\text{H}_3\text{C} - \text{CH} = \text{CH} - \text{CH}_2\text{OH}$
2056)	Formerly methanol was prepared by (a) Wood (b) Carbon (c) Wine (d) All of these	(a)	It is called as wood pirit as it was prepared by distillation of wood in absence of air.
2057)	Wood spirit is the other name for (a) Methanol (b) Ethanol (c) Butanol (d) Benzene	(a)	Formerly methanol was prepared by distillation of wood. That is why it is also called as wood spirit.
2058)	Now a days methanol is prepared	(d)	$\text{CO} + 2\text{H}_2 \xrightarrow{\text{ZnO} + \text{Cr}_2\text{O}_3}$



	from (a) CO (b) CO ₂ (c) H ₂ (d) Water Gas	450°C.200atm (methanol)
2059)	Temperature used for preparing methanol from water gas is (a) 4000°C (b) 450°C (c) 1000°C (d) 1200°C	(b) Compressed mixture of CO + H ₂ under 200 atmospheres is taken in the reaction chamber containing catalyst which is heated upto 450 – 500°C
2060)	Fermentation is a _____ process (a) Biological (b) Chemical (c) biochemical (d) Physical	(c) As fermentation takes place in the presence of enzymes secreted by micro organism (living organisms) such as yeast.
2061)	To prepare ethanol by fermentation the optimum temp. is (a) 10 – 20°C (b) 25 -- 35 °C (c)20 °C (d) 35 °C	(b) Fermentation takes place at this temperature.
2062)	The pressure used to prepare methanol from water gas is (a) 1 atm (b) 100 atm (c) 200 atm (d) 300 atm	© The water gas (CO + H ₂) are first compressed under a pressure of 200 atmosphere, then sent to reaction chamber.
2063)	Alcohol obtained by fermentation is up to (a) 10% (b) 12% (c) 20% (d) 35%	(b) It never exceeds 14% because beyond this limit enzymes become inactive.
2064)	Alcohol obtained by fermentation never exceeds (a) 10% (b) 14% (c) 12% (d) 35%	(b) 'same as above'.
2065)	95% alcohol is called (a) Rectified spirit (b) Spirit of wine (c) Spirit (d) Methylated	(a) The 12% alcohol obtained by fermentation of starch is distilled again and again till 95% alcohol is obtained, called rectified spirit.
2066)	Alcohol containing 10% methyl alcohol in it is called (a) Rectified spirit (b) Spirit of wine	(d) The ethanol is denatured by addition of 10% methanol to avoid the drinking use of ethanol. Such alcohol is called methylated spirit.



	(c) spirit	(d) Methylated spirit	
2067)	Lower alcohol are generally (a) Colourless Coloured (c) High viscous these	(b) (d) None of these	(a) Lower alcohols are generally colourless toxic liquids.
2068)	With the increase in carbon number the solubility of an alcohol (a) ncreases (b) Decreases (c) Remain unaffected of these	(b) (d) None of these	Solubility of alcohols decreases with increase in number of carbon atom because the hydrogen bonding is decreased.
2069)	Methyl alcohol and ethyl alcohols are (a) Liquids (b) Solids (c) Gases (d) Plasma	(a) (b) (c) (d)	Lower acohols are colourless liquids due to H-Bonding $\begin{array}{c} \text{R} \quad \quad \text{R} \\ \quad \quad \\ \text{O}^{\delta-} - \text{H}^{\delta+} \quad \dots \quad \text{O}^{\delta-} - \text{H}^{\delta+} \end{array}$
2070)	The acidic reactivity of an alcohol is due to _____ bond (a) C – H (b) O – H (c) C – O (d) None of these	(b) (c) (d)	The breaking of O – H bond indicates its acidic Character but it is very weak character $2\text{C}_2\text{H}_5 - \text{O} - \text{H} + 2\text{Na} \rightarrow 2\text{C}_2\text{H}_5 \text{O}^-\text{Na}^+ + \text{H}_2$
2071)	If a nucleophile attacks on alcohol then _____ bond breaks first (a) C – H (b) O – H (c) C – O (d) None of these	(c) (d)	When nucleophile attacks upon alcohol molecule, it attacks upon the electrophilic C-atom, breaking C—OH bond giving nucleophilic substitution type reaction.
2072)	If an electrophile attacks then _____ bond breaks first (a) C – H (b) O – H (c) C – O (d) None of these	(b) (c) (d)	Electrophile attacks upon the partially negatively charged oxygen, breaking O – H bond and displacing H^+ (the electrophile)
2073)	The order of reactivity of alcohols when O – H bond breaks (a) Primary > Secondary > tertiary (b) Tertiary > primary > secondary (c) Secondary > tertiary > primary	(a) (b) (c) (d)	When O – H bond breaks by attacks of an electrophile then alkoxide ion formed e.g. $2\text{C}_2\text{H}_5\text{OH} + 2\text{Na} \rightarrow 2\text{C}_2\text{H}_5\text{O}^-\text{Na}^+ + \text{H}_2$. The alkoxide ion becomes more unstable as the size of alkyl group increases. Therefore order of



	(d) Tertiary > secondary > primary	reactivity of alcohol is $\text{CH}_3\text{OH} > \text{p-alcohol} > \text{sec-alcohol} > \text{ter-alcohol}$.
2074)	The order of reactivity of alcohols when C – O bond breaks. (a) Primary > Secondary > tertiary (b) Tertiary > primary > secondary (c) Secondary > tertiary > primary (d) Tertiary > secondary > primary	(d) When nucleophile attacks upon the electrophilic carbon of ter-alcohols the carbocation is formed. And ter-carbonium ion is formed which is more stable than sec and p-carbonium ions. Therefore order of reactivity is ter-alcohol > sec-alcohol > p-alcohol
2075)	Which is an example of O – H bond reactivity of an alcohol when it reacts with (a) HCl (b) NH_3 (c) SOCl_2 (d) Na	(d) $2\text{C}_2\text{H}_5\text{OH} + 2\text{Na} \rightarrow \text{C}_2\text{H}_5\text{Na} + \text{H}_2$
2076)	Dehydration of an alcohol at 180° (a) Alkene (b) Ether (c) Ester (d) An hydride	(a) $\text{H}_3\text{C} - \text{CH}_3 - \text{OH} \xrightarrow[\text{180}^\circ\text{C}]{\text{conc. H}_2\text{SO}_4}$
2077)	Dehydration of an alcohol at 140° and Conc. H_2SO_4 gives (a) Alkene (b) Ether (c) Ester (d) An hydride	(b) $\text{CH}_3 - \text{CH}_2 - \text{OH} + \text{CH}_3 - \text{CH}_2 - \text{O} - \text{H} \xrightarrow{140^\circ\text{C}} \text{Conc. H}_2\text{SO}_4 \rightarrow \text{C}_2\text{H}_5 - \text{O} - \text{C}_2\text{H}_5$
2078)	Which is a reagent for Lucas test (a) $\text{ZnCl}_2 + \text{Conc. HCl}$ (b) ZN (c) Na (d) Br	(a) Primary, secondary and tertiary alcohols are identified and distinguished by reaction with conc. HCl and anhydrous ZnCl_2 . An oily layer of alkyl halide separate, out, ter-alcohol forms this oily layer immediately.
2079)	In Lucas test tertiary alcohol make an oily layer (a) Immediately (b) In 10 mins (c) On heating (d) Not	(a) Ter-alcohols are highly reactive form oily layer of ter-alkyl halide immediately.
2080)	In Lucas test secondary alcohol	(b) The reactivity of secondary alcohols is less than the reactivity of ter-

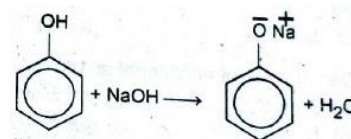


	make an oily layer (a) Immediately mins (c) On heating	(b) In 10 (d) Not	alcohols
2081)	In Lucas test primary alcohol make an oily layer (a) Immediately mins (c) On heating	(b) In 10 (d) Not	P=alcohols are least reactive, therefore with $\text{ZnCl}_2 + \text{Conc. HCl}$ from an oily layer of p=alkyl halide only on heating.
2082)	Carbolic acid is the other name for (a) Methanol (c) Propanol	(b) Ethanol (d) Phenol	It is its commercial name.
2083)	Which alkali is used in Dow's method (a) NaOH (c) Na_2CO_3	(b) KOH (d) RbOH	$\text{Chlorobenzene} + 10\% \text{ NaOH } 360^\circ\text{C} \rightarrow 150\text{atm}$ The sodium phenoxide is more stable than other such salts.
2084)	Phenol is _____ soluble in water (a) Completely (c) Not at all these	(b) Partially (d) None of these	It is sparingly soluble in water forming pink solution at room temperature but completely soluble at 68.5°C . Less solubility is due to less hydrogen bonding.
2085)	Phenol does not show _____ reactivity in common (a) Nucleophilic (c) Substitution these	(b) Electrophilic (d) None of these	Phenols are less reactive to nucleophiles. Nucleophile cannot replace OH^- ion because OH^- is a poor leaving group.
2086)	The pH of phenolic solution is normally (a) 3 (c) 5	(b) 2 (d) 6.5	Phenol is partially soluble in water and its solution has a pH of 5 or 6- since phenol has acidic character



2087) The reaction of phenol with NaOH (a)
is an example of reaction of _____ group

- (a) OH (b) Ring
(c) Phenyl (d) None of these



It is called a salt formation as phenol is acidic it reacts with the base.

2088) Those ethers which have two same alkyl groups are called _____ ether
(a) Simple (b) Complex
(c) Mixed (d) None of these

(a) Such ethers also called as symmetrical ethers having identical alkyl groups bonded to the O atom. e.g.
 $\text{H}_3\text{C} - \text{O} - \text{CH}_3$ dimethyl ether

2089) Which is called king of organic solvents?
(a) Ethers (b) Esters
(c) Alcohol (d) None of these

(a) Ethers are soluble in organic solvents but slightly soluble in water. Hence ethers are king of organic solvents.

2090) Which is most acidic
(a) Methanol (b) Ethanol
(c) Carboic Acid (d) Propanol

(c) Phenol (carboic acid) much more acidic than alcohol because after ionization the phenoxide ion is stabilized due to resonance, but alkoxide ion ($\text{R}-\text{O}^-$) from alcohols is not stable due to lack of resonance.

2091) Alcohol is
(A) Weak organic acid
(B) Strong mineral acid
(C) Strong organic acid
(D) All of them

A When alkoxide is formed inductive effect occurs from electron donating alkyl group due to which electron density on oxygen increases and thus the formation of alcohol is favored that is why alcohol is a weak organic acid.

2092) Rectified spirit is
(A) 95% ethanol
(B) 100% ethanol
(C) 20% methanol
(D) None of these

A Absolute alcohol is 100% rectified spirit is 95%

2093) CH_3OH on oxidation gives
(A) Formaldehyde
(B) Acetaldehyde
(C) Ketone
(D) Both b & c

A P° (alcohol) give aldehyde on oxidation. S° (alcohol) give ketones on oxidation. T° (alcohol) not oxidized.

2094) Equal masses of alcohols are taken, A P° (alcohol) due to large surface area



	which of them contain highest boiling point? (A) P° - alcohol (B) S° - alcohol (C) T° - alcohol (D) All of them		or contact area have high boiling point while in secondary and tertiary alcohol the contact area is less so less IMF thus low boiling point.
2095)	Which of the following has highest boiling point? (A) N - butanol (B) 2 - butanol (C) 2 - methyl - 2 propanol (D) 2 methyl 1 - propanol	A	Greater the surface area or area of contact more forces develop and highest will be the boiling point. Thus n-butanol has large surface area so IMF is strong and has high boiling point.
2096)	Primary, secondary and tertiary alcohols can be distinguished by (A) Catalytic dehydrogenation (B) Oxidation (C) Lucas test (D) All of these	C	Lucas test helps to distinguish alcohols. Tertiary alcohol + Lucas reagent → immediate reaction Secondary alcohol + Lucas reagent → Take 5/10 minutes Primary alcohol + Lucas reagent → not proceed without heating
2097)	Phenols react with acid halides or acid anhydrides in aqueous alkali solution to produce (A) Ethers (B) Esters (C) Ketones (D) Aldehydes	B	When phenol reacts with acid halide or acid anhydride ester is formed
2098)	Alcohols and phenols can be distinguished by (A) Reaction with bromine water (B) Reaction with FeCl ₃ (C) Iodoform test (D) All of these	D	All these are reagents which can distinguish alcohols and phenols.
2099)	Ethyl alcohol can be denatured by adding: (A) Pyridine (B) Methanol (C) Acetone (D) All of them	D	Denatured alcohol is unfit for human consumption. Pyridine, methanol, acetone etc can denature methanol.
2100)	Grain spirit is	D	Grain spirit is ethyl alcohol



	(A) Iso propyl alcohol (B) Iso butyle alcohol (C) N-propyl alcohol (D) Ethyl alcohol		
2101)	Tertiary alcohols are stable to oxidation under normal condition due to (A) Ack of a – hydrogen (B) High molecular mass (C) Bulky effect (D) Electronic effect	A	Absent of a-hydrogen in tertiary alcohol make it stable to oxidation under normal condition.
2102)	Protonation of alcohol is more easier than phenol because of (A) Reasonance (B) Lone pair (C) Polarity (D) All of these	A	In phenol resonance occur while alcohol there is no resonance, so the lone pair of oxygen is in resonance with the benze ring and thus delocalized that is why protonation of phenol is difficult.
2103)	The general formula of Mercaptane is (A) R-S-H (B) H-SH (C) R-O-R (D) R-S-R	A	R – SH is called mercaptane. It is an organic sulphur compound.
2104)	Considering O-H Bond Breaking, the correct reactivity order is: (A) $CH_3OH > 1^\circ \text{ alcohol} > 2^\circ \text{ alcohol} > 3^\circ \text{ alcohol}$ (B) $3^\circ \text{ alcohol} > 2^\circ \text{ alcohol} > 1^\circ \text{ alcohol} > CH_3OH$ (C) $1^\circ \text{ alcohol} > 2^\circ \text{ alcohol} > 3^\circ \text{ alcohol} > CH_3OH$ (D) None of them	A	When the OH bond breaks alkoxide is formed having negative charge on oxygen. Greater the alkyl group more will be the inductive effect and make the alkoxide ion more unstable thus it react again with proton and form a neutral molecule of alcohol. It can the regain its lost proton. Lesser the alkyl group stable will be the alkoxide ion. So greater the atability of alkoxide ion higher will be its reactivity.
2105)	Considering C- O bond breaking, the most reactive alcohol is (A) T°alcohol (B) S°-alcohol (C) P°alcohol (D) CH_3OH	A	When C – O bond breaking the most reactive is tertiary alcohol charge density on carbon atom increases, and hence around ocygen thus cleavage of C-O bond become easier. Moreover, a tertiary carbocation is formed which is more stable than secondary and primary. Greater the stability of carbocation higher is its reactivity.



2106)	Among the following the most acidic is (A) Alcohol (B) Phenol (C) Carbonic acidic (D) Water	C	Carboxylic acid is more acidic than all of these because a more stable carboxylate ion is formed due to resonance.
2107)	Sodium ethoxide is a (A) Nucleophile (B) Electrophile (C) Lewis acid (D) Both a & b	A	Sodium ethoxide is nucleophilic in nature. The $\text{CH}_3\text{CH}_2\text{O}$ acts as a nucleophile.
2108)	Organic compounds, which are considered to be the derivatives of water, are: (A) Alcohols (B) Ethers (C) Phenols (D) All of these	D	$\text{CH}_3 - \text{OH}$, $\text{C}_6\text{H}_5\text{OH}$, $\text{CH}_3 - \text{O} - \text{CH}_3$ are all derivatives of water.
2109)	Which of the following pair contains isomers of each other? (A) Propanoic acid and propanone (B) Acetone and acetaldehyde (C) Ethyl alcohol and dimethyl ether (D) Methyl alcohol and dimethyl ether	C	Ethyl alcohol and dimethyl ether are functional group isomers. $\text{CH}_3 - \text{CH}_2 - \text{OH}$ and $\text{CH}_3 - \text{O} - \text{CH}_3$ They have same molecular formula $\text{C}_2\text{H}_6\text{O}$ but different functional group.
2110)	Which one of the following correctly describes the acid base properties of phenol? (A) An acid stronger than carbonic acid (B) An acid weaker than water (C) A natural compound (D) An acid stronger than alcohol	D	Phenol is stronger acid than alcohol. Phenol lose H^+ ion and form phenoxide ion which is more stable than the alcohol alkoxide ion. In phenoxide ion resonance occur which impart stability.
2111)	Correct order of acidity (A) Phenol > water > alcohol (B) Phenol > alcohol > water	A	Phenol is more acidic because of stable phenoxide ion due to resonance. Water is more acidic than alcohol because the alkoxide ion of alcohol is comparatively unstable due



- (C) Alcohol > water > phenol
(D) Water > phenol > alcohol
- to positive inductive of alkyl group in alcohol.

2112)	Which of the following is more water soluble: (A) Alcohol (B) Phenol (C) Ether (D) Benzene	B	Hydrogen bonding are stronger in phenol as compared to alcohol so it is more soluble in water.
2113)	Which of the following dissolves in water to give an acidic solution? (A) $\text{CH}_3 - \text{O} - \text{CH}_3$ (B) $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_3$ (C) $\text{C}_6\text{H}_5\text{OH}$ (D) $\text{CH}_3 - \text{NH}_2$	C	All are basic except phenol. It dissolves in water and give the acidic solution.
2114)	Diethyl ether is (A) Acidic (B) Basic (C) Neutral (D) Amphoteric	B	Basic because of lone pair of electrons on oxygen atom. which make it basic. It form salt when react with strong acid.
2115)	Ethers are kept in brown bottles because (A) Brown bottles are cheaper than colourless clear bottles (B) Ethers absorb moisture (C) Ethers evaporate readily (D) Ethers are oxidized to explosive peroxides	D	Ether is highly sensitive toward atmospheric oxygen. In presence of light to combine with oxygen and form diethyl peroxide which is very explosive in nature that's why it is kept in coloured bottle (brown bottles).
2116)	In ethers, an oxygen atom links two alkyl or two aryl or alkyl-aryl groups. Oxygen atom in ether is hybridized: (A) sp (B) sp^2 (C) sp^3 (D) dsp^2	C	In ether oxygen has steric number four as $\text{P} - \text{O} - \text{R}$ Steric number = No. of attached atom of oxygen + lone pair $= 2 + 2 = 4$ So it is sp^3 hybridized.
2117)	Which of the following is least reactive: (A) Alcoholphenol (B) Ether	C	Ethers are less reactive because of the absence of polarity or charge separation in the molecule. Ethers are inert towards bases, alkali metals,



	(C) Water		active methylene groups etc.
2118)	Diethyl ether finds its uses in medicine as (A) Pain killer (B) Antiseptic (C) Anesthetic (D) All of them	C	Diethyl ether ($C_2H_5 - O - C_2H_5$) is a potent anesthetic.
2119)	The compound in which hydrogen bonding is not possible? (A) H_2O (B) CH_3COOH (C) CH_3OCH_3 (D) CH_3CH_2OH	C	For hydrogen bonding hydrogen should be attached to a highly electronegative atom (F,O,N) in ether there is no hydrogen attached to oxygen. It lacks the hydrogen bonding.
2120)	Decreasing order of reactivity of hydrogen halide acids in the conversion of $ROH \rightarrow RX$ is a. $HCl > HBr > HI > HF$ b. $HI > HBr > HCl > HF$ c. $HF > HCl > HBr > HI$ d. $HF > HBr > HI > HCl$		
2121)	Glycols and Glycerols can be differentiated on the basis of a. Number of C atoms b. Number of hydroxyl groups c. Position of hydroxyl groups d. All of the above		
2122)	Position of hydroxyl group classifies alcohols into a. Glycols and glycerols b. Aliphatic alcohols and aromatic alcohols c. Primary and tertiary alcohols d. Both b and c		
2123)	Lowest boiling point will be observed in a. 1-butanol b. 2-butanol c. 2-methyl-2-propanol d. 1-pentanol		
2124)	----- makes alcohols less acidic than water. a. Hydrogen bonding b. Structure		



- c. Alkyl group
- d. None of the above

2125) Acid ionization constant (K_a) is highest for

- a. Pri-alcohols
- b. See-alcohols
- c. Ter-alcohols
- d. Any alcohol

2126) Propanone is obtained when ----- B is oxidized

- a. N-propyl alcohol
- b. Iso-propyl alcohol
- c. Ter-butyl alcohol
- d. Sec-butyl alcohol

2127) Glycols oxidises into different A products. Ethylene glycol produces formic acid which treated with

- a. Acidified $KMnO_4$
- b. HIO_4
- c. $NaOH$
- d. O_3

2128) Thiols are analogues of D

- a. Ether
- b. Ketones
- c. Aldehyde
- d. Alcohols

2129) Thiols and thio ethers contains ----- B -- element instead of oxygen.

- a. N
- b. S
- c. Cl
- d. Mg

2130) Mercaptans are represented by B

- a. R-S-R
- b. R-S-H
- c. R-SO-R
- d. R-CS-H

2131) Thiols like methane thiol is added C to natural gas for

- a. To increase its combustion
- b. To decrease its leakage
- c. To detect its leakage
- d. To increase its pressure



2132)	Phenol is also known as a. Carbolic acid b. Picric acid c. Benzoic acid d. Terephthalic acid	A
2133)	1,2-dihydroxy benzene is commonly known as a. Hydroquinone b. Resorcinol c. Catechol d. Cresol	C
2134)	Carbolic acid is - % solution of phenol and water a. 5% b. 10% c. 15% d. 2%	A
2135)	The correct acidity order of carboxylic acids phenol, water and alcohols is a. Water > alcohols > phenol > carboxylic acids b. Phenol > carboxylic acid > alcohol > water c. Carboxylic acid > water > phenol > alcohols d. Carboxylic acid > phenol > water > alcohols	C
2136)	The rectified alcohol is a. 90% b. 100% c. 95% d. 50%	C
2137)	Which one of the following undergoes dehydration with ease? a. $\text{CH}_3 - \text{OH}$ b. $\text{C}_2\text{H}_5\text{OH}$ c. Isopropyl alcohol d. Ter-butyl alcohol	D
2138)	Which one of the following is more soluble in water? a. Methanol b. Butanol	A



- c. Hexanol
d. Heptanol

2139) Which one of the following D
compounds does not liberate CO_2 in
reaction with Na_2CO_3
a. HCl (dil)
b. H_2SO_4
c. HNO_3 (dil)
d. Phenol

2140) The alcohol which resists D
oxidation?
a. Methanol
b. Ethanol
c. Isopropyl alcohol
d. Ter-butyl alcohol

2141) In esterification reaction, which one B
of the following bonds of alcohol
undergo cleavage?
a. $\text{C}-\text{H}$
b. $\text{O}-\text{H}$
c. $\text{C}-\text{O}$
d. $\text{C}-\text{C}$

2142) Which one of the following D
alcohols does not undergo
dehydration reaction?
a. Thanol
b. Propanol
c. Butanol
d. Methanol

2143) When treated with acid _____ c
produces oxonium salt.
a. Phenol
b. Alcohol
c. Ether
d. All of the above

2144)

CHAPTER 19

ALDEHYDES AND KETONES

2145) The oxidation of pent-2-one (2- C
pentanone) with nascent oxygen
gives:



- A) Propanal B) Propanoic acid
C) Ethanoic acid D) Pentanoic acid

2146)	Alkene + $O_3 \rightarrow$ Ozonide "Zn + H_2O " Propanone + Propanal. The IUPAC name of alkene is: A. Hex-2-ene B. Hex-3-ene C. 2-methyl pent-1-ene D. 2-methyl pent-2-ene	D	
2147)	Which test of the following would you suggest to distinguish between the compounds? $\begin{array}{c} O \\ \\ R - C - H \\ \\ C - R \end{array} \quad \text{and} \quad \begin{array}{c} O \\ \\ R - C - R \end{array}$ A) Bayer's reagent B) Lucas reagent C) Tollens reagent D) None of the above		
2148)	Fehling's solution is added to the following compounds. Select the one that will show positive test. A) CH_3COCH_3 B) $CH_3COC_2H_5$ C) CH_3CHO D) $CH_3CH_2COCH_2CH_3$	B	Fehling solution react with aldehyde.
2149)	The reduction of aldehydes and ketones in the presence of zinc amalgam and HCl is termed as: A) Grignard reduction B) Clemmenson reduction C) Wolf-kishner reduction D) Friedel-craft reduction	B	
2150)	Select the test used for the estimation of glucose in blood and urine? A) Tollen's reagent test B) Fehling's solution test C) Benedict solution test	C	



	D) All of the above		
2151)	Carbon atom in carbonyl is: (a) sp hybridized (b) sp^2 hybridized (c) sp^3 Hybridized (d) None of the above.	B	
2152)	Select the statement which is NOT true about carbonyl group? (a) The three atoms attached to the carboxyl carbon are not in the same plane. (b) The carbon in carbonyl group is sp^2 hybridized. (c) The bond angles around carbon attached to three atoms are approximately 120° . (d) The carbonyl group forms resonating structure.	A	
2153)	The conversion of ethyne to acetaldehyde is carried out: (a) Ni $250^\circ C$ (b) $HgSO_4$ Fe_2O_3 $80^\circ C$ (c) Al_2O_3 Fe_2O_3 $150^\circ C$ (d) Pd , $70^\circ C$	D	
2154)	Ketones are prepared by the oxidation with $Na_2Cr_2O_7$ and H_2SO_4 of: (a) Primary alcohol (b) Secondary alcohol (c) Tertiary alcohol (d) All of the above	B	
2155)	Isopeopyl alcohol on oxidation with $Na_2Cr_2O_7$, in the presence of H_2SO_4 gives: (a) Acetaldehyde (b) Ethanoic acid (c) Acetone (b) Propanoic acid	C	
2156)	The σ bond for Med between carbon and oxygen atoms in aldehyde and ketone is due to the overlap of: (a) sp^2-sp (b) sp^2-sp^2 (c) sp^3-	B	



	sp^2 (d) $sp-sp$		
2157)	Acetaldehyde on oxidation by $Na_2Cr_2O_7/H_2SO_4$ gives; (a) CH_3COOH (b) C_2H_5OH (c) $OHC.CHO$ (d) None of the above	A	
2158)	All of the following tests are used to identify aldehyde except: (a) Tollen's test (b) Fehling test (c) Benedict test (d) Baeyer's test	D	
2159)	Acetaldehyde on treatment with Fehling's solution forms red precipitate. The color is due to the formation of: (a) silver nitrate (b) silver (c) CuO (d) Cu_2O	D	
2160)	Aldehydes may be distinguished from ketones by the use of: (a) Hoffman reagent (b) Grignard reagent (c) Tollens reagent (d) Cannizaro reagent	C	
2161)	Metaformaldehyde is a trimer of: (a) ethanol (b) ethanal (c) Methanal (d) methanol		
2162)	Which of the following will give a positive test with fehling solution? (a) acetic acid (b) ethyl acetate (c) formaldehyde (d) acetone	C	
2163)	Formaldehyde is used in the manufacture of: (a) Pararosaniline (b) Acetic anhydride (c) 1,3-Butadien (d) Smokeless powder	A	
2164)	Reduction of acetaldehyde with H_2/Ni gives: (a) Ethanol (b) Ethanoic acid (c) Ethane (d) Ethylene	A	

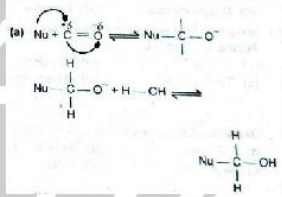


2165)	Methanal on treatment with Grignard's reagent CH_3MgBr the product for Med is: (a) $\text{CH}_3\text{CH}_2\text{OH}$ (b) CH_3OH (c) Manganese (d) Iodine	A
2166)	The compound Aldehyde hydrazone is: (a) $\begin{matrix} R \\ \\ H \end{matrix} > \text{CH} = \text{N} - \text{NH}_2$ (b) $\begin{matrix} R \\ \\ H \end{matrix} > \text{CH} - \text{NH} - \text{O} - \text{NH}_2$ (c) $\begin{matrix} R \\ \\ H \end{matrix} > \text{CH} - \text{NG} - \text{NH}_2$ (d) $\begin{matrix} R \\ \\ H \end{matrix} > \text{CH} - \text{O} - \text{N} = \text{NH}$	A
2167)	Which of the following is a terminal functional group? (a) Aldehyde (b) Ketone (c) Ether (d) None of these	(a) Aldehydes have CHO (functional group) as terminal group as there is only one bond on H Functional group carbon vacant i.e. $-\text{C}=\text{O}$.
2168)	Homologous series of both aldehydes and ketones have general formula (a) $\text{C}_n\text{H}_{2n+2}$ (b) $\text{C}_n\text{H}_{2n+1}$ (c) $\text{C}_n\text{H}_{2n}\text{O}$ (d) None of these	(c) H O $\text{R}-\text{C}=\text{O}$ and $\text{R}-\text{C}-\text{R}$ families have their general formula $\text{C}_n\text{H}_{2n}\text{O}$ e.g. H $\text{CH}_3-\text{C}=\text{O}$ has $\text{C}_2\text{H}_4\text{O}$ molecule formula O And $\text{CH}_3-\text{C}-\text{CH}_3$ has $\text{C}_3\text{H}_6\text{O}$ molar formula both correspond to $\text{C}_n\text{H}_{2n}\text{O}$.
2169)	If the two alkyl groups of a ketone are same then the ketone is called as _____ ketone (a) Alkyl (b) Symmetrical (c) Unsymmetrical (d) Complex	(b) Ketones having identical groups on the two sides of the carbonyl group called symmetrical ketone. E.g. $\text{CH}_3-\text{CO}-\text{CH}_3$ called dimethyl ketone.
2170)	If the two alkyl groups of a ketone are unlike then the ketone is called (a) Simple (b) Complex (c) Symmetrical (d)	(d) Ketones with two unlike groups on the carbonyl group called as unsymmetrical ketone eg. O



Unsymmetrical		$\text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH}_3$ is named as methyl ethyl ketone.
2171)	Oxidation of a primary alcohol (a) gives a/an (a) Aldehyde (b) Ketone (c) Alkyl halide (d) Ester	$\begin{array}{c} \text{R}-\text{CH}_2-\text{OH} + [\text{O}] \xrightarrow[\text{H}_2\text{SO}_4]{\text{K}_2\text{Cr}_2\text{O}_7} \\ \\ \text{H} \end{array}$ $\begin{array}{c} \text{H} \\ \\ \text{R}-\text{C}=\text{O} + \text{H}_2\text{O} \end{array}$ Upon oxidation of P-alcohol one H-atom from primary C and the other H of OH group form water, so alcohol changes to Aldehyde.
2172)	Oxidation of a secondary alcohol (b) gives a/an (a) Aldehyde (b) Keton (c) Alkyl halide (d) Ester	$\begin{array}{c} \text{R}-\text{CH}-\text{OH} + [\text{O}] \xrightarrow[\text{H}_2\text{SO}_4]{\text{K}_2\text{Cr}_2\text{O}_7} \\ \\ \text{R} \end{array}$ $\begin{array}{c} \text{R}-\text{C}=\text{O} + \text{H}_2\text{O} \\ \\ \text{R} \end{array}$ One H-atom from secondary carbon and the other H of OH group form water on oxidation giving ketone.
2173)	formaline contains _____ % (a) 80 (b) 37 (c) 8 (d) 52	(d) Formallin = 40% of formaldehyde + 8% methyl alcohol + 52% water.
2174)	Formaline contains _____ % (a) 80 (b) 37 (c) 8 (d) 52	(c) Same as above
2175)	The temperature used for preparing formaldehyde by laboratory method is (a) 100°C (b) 00°C (c) 400°C (d) 500°C	(b) $2\text{CH}_3 - \text{OH} + \text{O}_2 \xrightarrow[300^\circ\text{C}]{\text{Pt-asbestos}} 2\text{H} - \text{CHO} + 2\text{H}_2\text{O}$
2176)	The temperature used for preparing formaldehyde by industrial method is (a) 100°C (b) 00°C (c) 400°C (d) 500°C	(d) $2\text{CH}_3\text{OH} + \text{O}_2 \xrightarrow{500^\circ\text{C}} 2\text{H} - \text{CHO} + 2\text{H}_2\text{O}$



- 2177)** The catalyst used for industrial preparation of acetaldehyde is
 (a) PdCl_2 (b) CaCl_2
 (c) NaOH (d) Na_2CO_3
- 2178)** The catalytic promoter used for the industrial preparation of acetaldehyde is
 (a) PdCl_2 (b) CaC_2
 (c) $\text{Pd} + \text{CaCl}_2$ (d) None of these
- 2179)** Most of the reactions of carbonyl groups are
 (a) Nucleophilic addition
 (b) Nucleophilic substitution
 (c) Electrophilic addition
 (d) Electrophilic substitution
- 2180)** The nucleophilic addition reactions on a carbonyl functional group is catalysed by a/an
 (a) Acid (b) Base
 (c) Both a and b (d) None of these
- 2181)** The product formed in the presence of an acid or base for same carbonyl compounds is
 (a) Different (b) Same
 (c) Reactive (d) Un-reactive
- (a)** $2\text{CH}_2 = \text{CH}_2 + \text{O}_2 \xrightarrow{\text{PdCl}_2 + \text{CuCl}_2} \text{H}_2\text{O}$
 $2\text{CH}_3\text{—CHO}$
 It is air oxidation of ethylene.
- (b)** PdCl_2 is a catalyst and CuCl_2 is a promoter alongwith it.
- (a)** 
- It indicates just addition reaction.
- (c)** Addition of nucleophile in aldehydes as well as ketones takes place in base as well as an acid e.g.
- $\text{HO}^- + \text{H—CN} \rightleftharpoons \text{H}_2\text{O} + \text{CN}^-$
- $\text{CN}^- + \text{CH}_3\text{—C(=O)—H} \rightleftharpoons \text{CH}_3\text{—C(O}^-\text{)(CN)—H}$
- And acid catalysed reaction as under.
- $\text{H}_3\text{C—C(=O)—H} + \text{H}_2\text{N—OH} \xrightarrow{\text{H}^+} \text{H}_3\text{C—C(=NOH)—H}$
 (oxime)
- (b)** Whether the addition of a nucleophile to the carbonyl compound is base catalysed or acid-catalysed, the adduct is same. Base simply increases the nucleophilic character, while an acid catalyst promotes the nucleophilic attack by increasing the positive character of the carbonyl carbon.



2182) A base catalyst increases the _____ character of the reagent (a) Electrophilic (b) Nucleophilic (c) Carbonyl (d) None of these	(b) A base added increases the nucleophilic character of the reagent e.g. $\text{OH}^- + \text{H} - \text{CN} \rightarrow \text{H}_2\text{O} + \text{CN}^-$ $\text{CN}^- + > \text{C}^{+\delta} = \text{O}^{-\delta} \rightarrow \text{C} - \text{O}^-$ CN
2183) An acid catalyst promotes the nucleophilic attack by increasing _____ character of carbonyl carbon atom (a) Electrophilic (b) Nucleophilic (c) Acidic (d) Basic	(a) Acid added combines with the carbonyl oxygen and increases the electrophilic character of the carbonyl carbon $> \text{O} = \text{C} + \text{H}^+ \rightarrow \text{C} = \text{O}^+ - \text{H}$ $\text{Nu} + > \text{C} = \text{O}^+ - \text{H} \rightarrow \text{Nu} - \text{C} - \text{OH}$
2184) A compound having an aldehyde and OH functional groups is called (a) Aldene (b) aldol (c) Enol (d) ol	(b) Two molecules of the same or different carbonyl compounds condense to form an aldol in presence of base. $\begin{array}{c} \text{H} \qquad \qquad \text{H} \\ \text{CH}_3 - \text{C} = \text{O} + \text{H} - \text{CH}_2 - \text{C} = \text{O} \\ \text{dil. NaOH} \end{array}$ $\begin{array}{c} \text{OH} \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CHO} \\ \text{(aldol)} \end{array}$
2185) During the mechanism of aldol condensation a/an _____ is formed (a) Oxide (b) Alkali (c) Alkoxide ion (d) None of these	(c) $\text{OH}^- + \text{H} - \text{CH}_2 - \text{CHO} \rightarrow$ $\text{H}_2\text{O} \qquad \qquad \text{H}_2\text{C} - \text{CHO} +$ Carbanion $\begin{array}{c} \text{H} \\ \text{H}_3\text{C} - \text{C} = \text{O} + \text{C}^-\text{H}_2 - \text{CHO} \\ \text{O}^- \end{array}$ $\text{H}_3\text{C} - \text{CH} - \text{CH}_2 - \text{CHO}$ An alkoxide ion.
2186) For aldol condensation _____ is necessary (a) α - H (b) α - OH	(a) Aldehydes and ketoses possessing α-H-atom react in the cold dilute solution of an alkali to form the

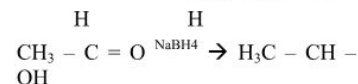
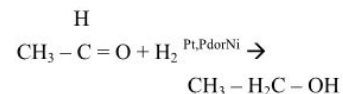


(c) a – C (d) All of these	addition product known as aldols. e.g. $\begin{array}{c} \text{H} \\ \text{H}_3\text{C} - \text{C} = \text{O} + \text{H} - \text{CH}_2 - \text{CHO} \\ \text{dil. NaOH} \rightarrow \\ \text{OH} \\ \text{H}_3\text{C} - \text{CH} - \text{CH}_2 - \text{CHO} \\ \text{(aldol)} \end{array}$
2187) Aldehydes which do not have a – (b) hydrogen undergo (a) Aldol comination (b) Cannizzaro's reaction (c) Substitution (d) Elimination	Formaldehyde, benzaldehyde have no a – H, when these are treated separately with 50% NaOH undergo disproportionation reaction forming an alcohol and a carboxylic acid salt $2\text{H} - \text{CHO} + \text{NaOH} \rightarrow \text{CH}_3 - \text{OH} + \text{H} - \text{COO}^- \text{Na}^+$
2188) In aldol condensation reaction, a double bond is formed between _____ and _____ carbon atoms (a) A and a (b) a and B (c) a and Y (d) None of these	Aldols formed on heating in presence of dilute acid to form an unsaturated carbonyl compound. Double bond is between A – C and B – C $\begin{array}{c} \text{OH} \quad \text{H} \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} = \text{O} \xrightarrow{\text{dil. HCl}} \\ \text{H} \\ \text{CH}_3 - \text{CH} = \text{CH} - \text{C} = \text{O} \end{array}$
2189) The base used in Cannizzar's reaction is (a) NaOH (b) KOH (c) CHI_3 (d) All of these	50% NaOH is used in this reaction. Although KOH is a stronger base than NaOH but in laboratory as well as on large scale NaOH and to a lesser extent KOH, is widely used as a source of the OH^- ion. Reaction with KOH becomes explosive.
2190) Which of the following is halo form (a) CHBr_3 (b) CHCl_3 (c) CHI_3 (d) All of these	(d) Generally haloform is CHX_3 when X is Cl, Br or I.
2191) Aldehyde are reduced to	(a) Aldehydes are reduced to p-alcohol as



- (a) Primary alcohol
(b) Secondary alcohol
(c) Tertiary alcohol
(d) All of these

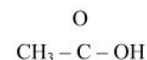
addition of hydrogen takes place at
C = O group.



2192) Ketones are reduced to (a) Primary alcohol (b) Secondary alcohol (c) Tertiary alcohol (d) All of these	(b) Addition of hydrogen at C = O gives sec-alcohol $\begin{array}{c} \text{HH}_3 \qquad \text{CH}_3 \\ \qquad \\ \text{H}_3\text{C} - \text{C} = \text{O} \xrightarrow{\text{NaBH}_4} \text{H}_3\text{C} - \text{CH} - \text{OH} \\ \text{(sec-propyl alcohol)} \end{array}$
2193) Which is used for the reduction of aldehydes and ketones (a) NaBH₄ (b) Pt/Pd (c) ni (d) All of these	(a) NaBH₄ provides H⁻ ion. And Pt/Pd and Ni without hydrogen cannot reduce aldehyde or ketones. $\text{H}^- + >\text{C}^{\text{+8}} = \text{O}^{\text{-8}} \rightarrow \text{H} - \text{C} - \text{O}^-$ $\text{H} - \text{C} - \text{O}^- + \text{H} - \text{OH} \rightarrow \text{H} - \text{C} - \text{OH} + \text{OH}^-$
2194) Aldehyds are oxidized by (a) tollen's reagent (b) fehling's solution (c) benedict's solution (d) all of these	(d) Ag⁺ form Tollen's reagent and Cu⁺⁺ ions form Fehling solutino and Benedicts solution oxidize the - CHO (aldehyde) into carboxyl group - COOH. $\text{R} - \text{CHO} + 2\text{Cu}(\text{OH})_2 + 2\text{NaOH} \rightarrow \text{RCOONa} + \text{Cu}_2\text{O} + \text{H}_2\text{O}$
2195) Chromic acid is used to oxidize (a) Aldehyde (b) Ketone (c) Both a and B (d) None of these	(a) Aldehydes are oxidized to carboxylic acids by strong oxidizing agents such as K₂Cr₂O₇ + H₂SO₄ (chromic acid). The H-atom attached to the carbonyl group in Aldehyde is oxidized to OH group. $\begin{array}{c} \text{H} \\ \\ \text{CH}_3 - \text{C} = \text{O} + [\text{O}] \text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4 \end{array}$



→



As ketones do not have H-atom to the carbonyl carbon are not oxidized by chromic acid.

2196) Which is more reactive (a) an Aldehyde (b) A ketone (c) Both have same reactivity (d) None of these	(a) Aldehydes have at least one H-atom bonded to the carbonyl carbon. But in ketones the carbonyl carbon is bonded to the two alkyl groups. Alkyl groups are electron donating which decreases the electrophilic character of carbonyl carbon. Thus attack of nucleophile on ketone is not rapid as in aldehydes.
2197) Aldehyds and ketones form _____ ppts with 2,4 dinitrohenyl hydrazine (a) Red (b) Yellow (c) Red or yellow (d) None of these	(c) Aldehydes and ketones form 2,4=dinophenyl hydrazones usually yellow or orange solids. This reaction is for identification of aldehydes and ketones.
2198) Aldehyde and small methyl ketones form crystalline _____ ppts with saturated sodium disulphate solution (a) White (b) Red (c) Yellow (d) None of these	(a) Sodium bisulphite adduct with aldehyde and small methyl ketones is a white crystalline precipitate.
2199) In Tolten's test, the end product is _____ formed (a) White ppts (b) Red ppts (c) Yellow ppts (d) Silver mirror	(d) $\text{R} - \text{CHO} + 2[\text{Ag}(\text{NH}_3)_2]^+ + 2\text{OH}^- \rightarrow \text{RCOONH}_4 + 2\text{Ag} + 3\text{NH}_3$ (Silver mirrors) Ag^+ is reduced to metallic silver but oxidized Aldhyde to carboxylic acid.
2200) Fehling's solution test is given by (a) Aldehyde (b) Ketones (c) Both a and b (d) None of these	(a) $\text{R} - \text{CHO} + 2\text{Cu}(\text{OH})_2 + 2\text{NaOH} \rightarrow \text{R} - \text{COONa} + \text{Cu}_2\text{O} + \text{H}_2\text{O}$ (red ppt). Only aliphatic aldehydes react with Fehling's solution forming a brick red



		ppt.
2201)	The colour of ppts formed by Fehling's test is (a) Brick red (b) Red (c) yellow (d) Orange	(a) Cupric ion (Cu^{++}) is reduced to cuprous ion forming a brick red of Cu_2O and it oxidizes the aldehydes to carboxylic acid group.
2202)	The colour of ppts formed by Benedict's test is (a) Brick red (b) Wine red (c) yellow (d) Orange	(a) Benedicts solution is an alkaline cupric citrate. Therefore Cu^{++} ion from Benedicts solution is reduced to red ppt. of Cu_2O . it oxidizes aldehyde to carboxylic acid.
2203)	On adding sodium nitroprusside ketones give (a) Red (b) Wine red (c) White (d) Orange	(b) This is a test used to distinguish between ketones and aldehydes because aldehydes do not give this test.
2204)	Formaldehyde is used to make (a) Plastics (b) Medicine (c) Antiseptic (d) All of these	(d) Formaldehyde is used in manufacture bakelite (plastic), formalin (an antiseptic) in making medicine urotropine used as urinary antiseptic.
2205)	Acetaldehyde is used to make (a) Rubber (b) Antiseptics (c) Phenolic resin (d) All of these	(d) Acetaldehyde ammonia used as a rubber accelerator as an antiseptic inhalent in nasal infection and acetaldehyde is used to make phenolic nesins.
2206)	Which is a metamer molecule (a) Acetaldehyde (b) Formaldehyde (c) Both a and b (d) None of these	(c) Formaldehyde polymerizes in presence of dil- H_2SO_4 to give meta formaldehyde $ \begin{array}{c} \text{O} \\ \text{CH}_2 \quad \text{CH}_2 \\ 3\text{H} - \text{CHO} - \text{H}_2\text{SO}_4 \rightarrow \\ \text{O} \quad \text{O} \\ \text{CH}_2 \end{array} $ Where acetaldehyde polymerizes to give paraleddehyde.
2207)	Formalin is a (a) 40% solution of CH_3CHO (b) 60% solution of HCHO (c) 100% solution of HCHO	D Formaline is 40% solution of HCHO



(d) 40% solution of HCHO

2208)	Which of the following has high boiling point? (a) Alcohol (b) Aldehyde (c) Ketone (d) Both b and c	A	Alcohol contain OH group allowing it for H – bonding which is stronger than intermolecular forces in aldehyde and ketone. Aldehyde and ketones have no H-bonding therefore boiling point of alcohol are greater.
2209)	Select the incorrect statement about carbonyl group. (a) The three atoms attached to carbonyl carbon are not in the same plane (b) The carbon in carbonyl group is sp^2 hybridized (c) Bond angle in carbonyl group is 120° (d) The carbonyl group form resonating structure	A	The carbonyl carbon is sp^2 hybridized so it is planar. The atoms attached to them are in the same plane.
2210)	The conversion of ethyne to acetaldehyde is carried out (a) Ni at 250°C (b) $\text{H}_2\text{SO}_4, \text{HgSO}_4, 80^\circ\text{C}$ (c) $\text{Al}_2\text{O}_3, \text{Fe}_2\text{O}_3, 150^\circ\text{C}$ (d) Pd, 70°C	B	The conversion of ethyne to acetaldehyde is carried by $\text{HgSO}_4, \text{H}_2\text{SO}_4$ and 80°C temperature. $\text{HC} \equiv \text{CH} + \text{H}_2\text{O} \xrightarrow{\text{HgSO}_4, \text{H}_2\text{SO}_4} \text{CH}_3\text{CHO}$
2211)	What is the hybridization of carbon in CHO group? (a) sp (b) sp^2 (c) sp^3 (d) dsp^2	B	In carbonyl compound, carbon is sp^2 – hybridized. It has steric number 3 because it is attached to 3 atoms.
2212)	1°-OH , 2°-OH and 3°-OH synthesized by reaction R-Mg-X with _____ respectively. (a) Methanol, ethanol, propanone (b) Amine, ether, H_2O (c) HCOH , RCOH , RCOR (d) Both (a) and (c)	C	Primary and secondary alcohol is produced by aldehyde while tertiary alcohol is produced by ketone by reacting with the Grignard's reagent. Methanol + Grignard's reagent $\rightarrow$ Primary alcohol Ethanol + Grignard's reagent $\rightarrow$ secondary alcohol Propanone + Grignard's reagent $\rightarrow$ tertiary alcohol $\text{HCOH} + \text{RM}_\text{g}\text{X} \rightarrow 1^\circ \text{ alcohol}$ $\text{RCOH} + \text{RM}_\text{g}\text{X} \rightarrow 2^\circ \text{ alcohol}$ $\text{RCOR} + \text{RM}_\text{g}\text{X} \rightarrow 3^\circ \text{ alcohol}$



2213)	Aldehydes and ketone both can react with (a) tollen's reagent (b) benedict's reagent (c) fehling's reagent (d) grignard's reagent	D	Aldehyde + Grignard reagent $\rightarrow$ P° alcohol (when formaldehyde react) or S° alcohol (other aldehyde when react) Ketone + Grignard reagent $\rightarrow$ T° (Alcohol)
2214)	Reaction of grignard's reagent with an aldehyde followed by acid hydrolysis to form an alcohol is (a) nucleophilic substitution reaction (b) electrophilic substitution reaction (c) nucleophilic addition reaction (d) electrophilic addition reaction	C	To R of Grignard reagent is nucleophilic so it attacks on carbonyl carbon of aldehyde so nucleophile alkyl group of Grignard reagent is added there. Thus this reaction is a nucleophilic addition reaction and result alcohol.
2215)	The class of compound which are reduced to primary alcohols and respond to Fehling's solution are known as (a) Aromatic ketones (b) Aliphatic ketones (c) Aliphatic aldehydes (d) Aromatic amines	C	Only aliphatic aldehyde reduced to primary alcohol and give a positive test with Fehling's solution. Ketone and aromatic aldehyde do not react with Fehling's solution. Benzaldehyde do not react with Fehling's solution.
2216)	Silver mirror test is given by (a) Ethers (b) Ketones (c) Acids (d) Aldehydes	D	Tollen's reagent oxidize aldehyde in a glass test tube results silver mirror.
2217)	Ketones don't react with Tollen's and Fehling's reagents because these reagents are (a) Neutral (b) Amphoteric (c) Mild oxidizing agents (d) Strong oxidizing agents	C	Aldehyde can be oxidized by both strong and weak oxidizing agent while ketone cannot be oxidized by weak oxidizing agent. Tollen's and Fehling's reagents are weak oxidizing agents.
2218)	Pick up the incorrect statement regarding aldehydes and ketones (a) Both can be readily polymerized (b) Both can be reduced into alcohols (c) Both can be readily oxidized	C	Ketones cannot be oxidized by mild oxidizing agent while aldehydes can be oxidized because ketone requires the breaking of strong carbon-carbon bond. Ketone can be oxidized only by strong oxidizing agent like Conc. HNO_3 , $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$.



	with mild oxidizing agents (d) All of these		KMnO ₄ /H ₂ SO ₄ etc.
2219)	Aldehydes and ketones both cannot be reacted with (a) Sodium bisulfate (b) Grignard's reagent (c) 2,4-Dinitrophenyl hydrazine (d) Ammonical silver nitrate	D	Tollen's reagent is a solution of aqueous silver nitrate with aqueous ammonia. Aldehyde can react with Tollen's reagent. Tollen's reagent is a weak oxidizing agent while ketone can be oxidizing agent. This test is used to differentiate between aldehydes and ketones.
2220)	The compound which reacts with Fehling solution is a. C ₆ H ₅ COOH b. HCOOH c. C ₆ H ₅ CHO d. CH ₂ ClCH ₂ Cl	C	
2221)	Which one of the following gives silver mirror test? a. CH ₃ COOH b. CH ₃ COCH ₃ c. CH ₃ CH ₂ OH d. CH ₃ CHO	D	
2222)	Addition of HCN to acetone forms cyano hydrin. It is an example of reaction a. Electrophilic addition b. Nucleophilic addition reaction c. Electrophilic substitution d. Nucleophilic substitution	B	
2223)	Aldehydes are reducing agents. In reaction with Fehling solution they reduce a. Cu ⁺² ions b. Ag ⁺ ions c. NaOH d. Tartaric acid	A	
2224)	Which of the following statement is not correct? a. Aldehydes and ketones undergo nucleophilic addition b. Aldehydes and ketones	B	



- undergo electrophilic substitution
- c. Aldehydes and ketones contain polar carbonyl group
- d. Lower members of aldehydes and ketones are soluble in water due to hydrogen bonding

- 2225) Hemiacetal reacts with excess of A alcohol producing acetal. Acetal contains
- a. Two ether functional groups bonded to same carbon on either sides
- b. An ether and keto functional group bonded to same carbon
- c. An ether and alcohol functional groups bonded to same carbon
- d. Two keto functional group bonded to same carbon on either sides

- 2226) On heating aldehydes with D Fehling's solution we get a ----- precipitate
- a. Pink
- b. Black
- c. Yellow
- d. Brick red

- 2227) Ketones are less reactive than D aldehydes it is due to
- a. Alkyl groups are electron donating
- b. Steric hindrance
- c. Acidic nature
- d. Both a and b

- 2228) Which one will React with both A aldehydes and Ketones
- a. Grignard reagent
- b. Tollen's reagent
- c. Fehling's reagent
- d. Benedict reagent

- 2229) Which reaction maybe associated B



with both aldehydes and ketones?

- a. Nucleophilic substitution
- b. Nucleophilic addition
- c. Oxidation
- d. All of the above

- | | | | |
|-------|---|---|--|
| 2230) | The C atom of carbonyl group is | B | |
| | a. sp hybrid | | |
| | b. sp^2 hybrid | | |
| | c. sp^3 hybrid | | |
| | d. dsp^2 hybrid | | |
| 2231) | Reduction of aldehydes and ketones to hydrocarbons using zinc amalgam and HCl is called | D | |
| | a. Cope reaction | | |
| | b. Aldole condensation | | |
| | c. Wolf-kishner reaction | | |
| | d. Clemenson reaction | | |
| 2232) | Formaldehyde gives an addition product with methyl magnesium iodide which upon hydrolysis gives | C | |
| | a. N-propyl alcohol | | |
| | b. Iso-propyl alcohol | | |
| | c. Ethyl alcohol | | |
| | d. Methyl alcohol | | |
| 2233) | Which of the following compounds can react with Ammonical silver nitrate solution to form silver mirror? | D | |
| | a. Acetone | | |
| | b. Ethanol | | |
| | c. Ether | | |
| | d. Ethanol | | |
| 2234) | Which of the following compounds precipitates Cu_2O from Fehling's solution but does not react with sodium metal? | B | |
| | a. C_2H_5OH | | |
| | b. C_2H_5CHO | | |
| | c. $CH_3CH(OH)CH_3$ | | |
| | d. CH_3COCH_3 | | |
| 2235) | When propanal is heated with Fehling's solution there is | C | |
| | a. Color change from green to | | |



- orange
- b. A negative test with Tollen's reagent
- c. A color changes from blue to red
- d. No color change.

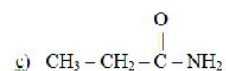
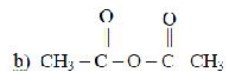
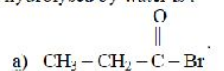
2236)

CHAPTER 20

CARBOXYLIC ACIDS AND THEIR DERIVATIVES

2237)

The compound which can not be hydrolysed by water is :

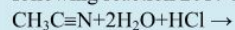


d) none of the above

d

2238)

Choose the True product of the following reaction 2017-Med



- A. $\text{CH}_3\text{COOH} + \text{NH}_3$
B. $\text{CH}_3\text{COOH} + \text{NH}_4\text{Cl}$
C. $\text{CH}_3\text{COCl} + \text{NH}_3$
D. CH_3CONH_2

B

2239)

The carbonyl group of carboxylic acid does not exhibit the characteristic reaction of aldehyde and ketone due to:

- A. The C of carbonyl is less positive
B. The C of carbonyl is more positive
C. The C of ketone is less positive

A



D. Does depend on atom

2240)	Which of the following reactants when react produce ester? A) $\text{CH}_3\text{CH}_2\text{-OH}$ and PCl_3 B) CH_3COOH and $\text{CH}_3\text{-O-CH}_3$ C) $\text{C}_2\text{H}_5\text{-OH}$ and HCOOH D) CH_3OOH and CH_3CHO	C	
2241)	Regarding reactivity of the compounds having carbonyl group. The most reactive compound out of the following is: $\begin{array}{c} \text{O} \\ \\ \text{a) } \text{CH}_3 - \text{CH}_2 - \text{C} - \text{CH}_3 \end{array}$$\begin{array}{c} \text{O} \\ \\ \text{b) } \text{CH}_3 - \text{C} - \text{OH} \end{array}$$\text{c) } \text{CH}_3 - \text{C} - \text{N}$$\text{d) all of these}$	C	
2242)	Select the correct product: $\text{R-C}\equiv\text{N} + \text{H}_2\text{O}$ The hydrolysis of Alkyl nitriles in the presence of acid form (a) R CO NH_2 (b) $\text{R CH}_2\text{NH}_2$ (c) R-CJ-NH_2 (d) RCOOH	D	
2243)	What is the name of the carboxylic acid given below? $\text{HOOC(CH}_2)_3\text{COOH}$ A) Propane dioic acid B) Pentane dioic acid C) Pentane dicarboxylic acid D) Propane dicarboxylic acid	B	
2244)	Which one of the following is strongest acid? (a) FCH_2COOH (b) CH_3COOH	A	In Carboxylic acid ,electron withdrawing groups i.e Halogens increase acidity while Electron donating groups decrease acidity.



	(c) ClCH_2COOH (d) $\text{C}_6\text{H}_5\text{CH}_2\text{COO}$	
2245)	Which is the strongest acid? (a) CH_3COOH (b) Cl_2CHCOOH (c) ClCH_2COOH (d) Cl_3CCOOH	D
2246)	Which of the following carboxylic acids is the strongest? (a) Dichloroacetic acid (b) Chloroacetic acid (c) Formic acid (d) Acetic Acid	A
2247)	Which of the following statement is false about the acetic acid? (a) Acetic acid is stronger acid than monochloro-acetic acid. (b) Acetic acid is weaker acid than trichloro-acetic acid (c) acetic acid is weaker acid than formic acid (d) Acetic acid is weaker acid than hydrochloric acid.	A
2248)	Which of the following is NOT correct in case of carboxylic acids? (a) they are polar molecules (b) they form H – bonds (c) they are stronger than mineral acids (d) they have higher boiling points than corresponding alcohols.	C
2249)	Which of the following compounds on treatment with NaHCO_3 will liberate CO_2 ? (a) CH_3COOH (b) $\text{C}_2\text{H}_5\text{NH}_2$ (c) CH_3COCH_3 (d) $\text{CH}_3\text{CH}_2\text{OH}$	A
2250)	Which of the following reagent will convert acetic acid into acetyl chloride? (a) NaCl (b) HCl/ZnCl_2 (c) SOCl_2 (d) Hg	C
2251)	What will be the product when PCT_5 reacts with acetic acid?	B



(a) CH_3Cl (b) CH_3COCl

(c) CH_3COCl_2 (d)
 $\text{CH}_3\text{CH}_2\text{COCl}$

2252)	Acetic acid reacts with thionyl chloride. The product obtained is:	A
	(a) $\text{CH}_3\text{COCl} + \text{SO}_2 + \text{HCl}$ (b) $\text{CH}_3\text{Cl} + \text{CH}_3\text{COCl} + \text{SO}_2$ (c) $\text{CH}_3\text{COCH}_3 + \text{SO}_2$ (d) None of the above	
2253)	Carboxylic acid reacts readily with alcohols in the presence of catalytic amounts of mineral acids to yield compounds called.	B
	(a) Azides (b) Esters (c) Ketones (d) Ethers	
2254)	Acetic acid reacts with methanol in the presence of an acid catalyst to give:	C
	(a) Methyl formate (b) Ethyl formate (c) Methyl acetate (d) Ethyl acetate	
2255)	Acetic acid undergoes reduction with LiAlH_4 to give:	D
	(a) ethanal (b) ethane (c) ethyne (d) ethanol	
2256)	Carboxylic acid forms alcohol in presence of LiAlH_4 and the process is:	A
	(a) Reduction (b) Oxidation (c) Hydrolysis (d) None of above	
2257)	Which is NOT true about amino acids?	D
	(a) They have two functional groups (b) They show both acidic and basic characteristics (c) They are the basic units of proteins	



(d) They do not exist in solid state

2258)	All amino acids found in proteins are: (a) α -amino acids (b) β -amino acids (c) Both α and β (d) None of the above	A	
2259)	Fatty acids are: a) Unsaturated dicarboxylic acid b) Long chain alkanolic acid c) Aromatic carboxylic acid d) Aromatic dicarboxylic acid	B	
2260)	Saponification of a fat: (a) Always results in the formation of soaps. (b) Results in the formation of esters. (c) Results in the formation of waxes. (d) Results in the formation of glycerol and soap.	A	
2261)	Carbylamine test is given by: a) Primary amines b) Secondary amines c) Tertiary amines d) All of these	A	
2262)	The characteristic reaction of carboxylic acid is: a) Electrophilic substitutions b) Nucleophilic substitution c) Electrophilic addition d) Nucleophilic addition	D	
2263)	Acetic acid reacts with methyl alcohol in the presence of acid catalyst to give: a) Ethyl formate b) Ethyl acetate c) Methyl formate d) Methyl acetate	D	
2264)	Choose reactants whose reaction product is ester: A) CH_3COOH and CH_3OCH_3 B) CH_3COOH and $\text{C}_2\text{H}_5\text{CHO}$	C	



	C) CH_3COOH and $\text{CH}_3\text{CH}_2\text{OH}$ D) CH_3COOH and CH_3COCH_3	
2265)	Hydrolysis of ester in the presence of KOH is called: A) Estrification B) Decarboxylation C) Saponification D) Neutralization	C
2266)	Carboxylic acid contains: (a) Hydroxyl group (b) A hydroxyl and carboxyl group (c) A carboxyl grup (d) A carboxyl and oldehydic group	
2267)	Which of the following reagents may not be used for the oxidation of aldehydes and ketones to carboxylic acids? (a) LiAlH_4 (b) KMnO_4 (c) $\text{K}_2\text{Cr}_2\text{O}_7$ (d) $\text{Na}_2\text{Cr}_2\text{O}_2$	A
2268)	The hydrolysis of an ester proceeds most slowly under the condition of: (a) High acidity (b) High basicity (c) Neutrality (d) High temperature	
2269)	Choose reactants whose reaction product is ester; A) CH_3COOH and CH_3OCH_3 B) CH_3COOH and $\text{C}_2\text{H}_5\text{OH}$ C) CH_3COOH and CH_3CHO D) CH_3COOH and CH_3COCH_3	
2270)	Most of the enzymes start showing activities in the range of PH between: a) 2–4 (b) 5–9 (c) 3–5 (d) 10–12	b
2271)	Hydrolysis of fats occurs in the mouth and stomach to a slight extent because: (a) Very small amount of Lipase is secreted by the salivary glands (b) Small amount of lipase is secreted by the salivary glands	b



- (c) No lipase is secreted by the salivary glands
 (d) Large amount of lipase is secreted by the salivary glands

2272)	Which is the correct IUPAC name of the compound given below? (a) Acetophenon (b) Phenylethanone (c) Phenyl ethanal (d) Phenylacetate	b	
2273)	Carboxylic acid may be (a) Aliphatic (b) Aromatic (c) Both a and b (d) None	(c)	Aliphatic carboxylic acid have general formula $R - COOH$ where $R = H$ or any alkyl group. Aromatic carboxylic acids. $Ar - COOH$ where Ar is phenyl or aryl group.
2274)	Aliphatic monocarboxylic acids are generally called (a) Active compound (b) Fatty acids (c) Functional group (d) none	(b)	Aliphatic couboxylic acids are integral part of fats and oils, thus aliphatic carboxylic acids are called fatty acids e.g. Fat $CH_2 - O - CO - C_{17}H_{35}$ $CH - O - CO - C_{17}H_{35}$ gives $CH_2 - O - CO - C_{17}H_{35}$ $C_{17}H_{35} - COOH$ stearic acid
2275)	The acids obtained by the hydrolysis of fats and oils are called (a) Active compound (b) Fatty acids (c) Functional group (d) none	(b)	Fats and oils (Triglycerides) when hydrolysed by enzymes converted to fatty acids and glycerol. $CH_2 - O - CO - R$ $CH - O - CO - R + 3H - OH \xrightarrow{Lip}$ $CH_2 - O - CO - R$ $CH_2 - OH$ $CH - OH + 3R - COOH$ $CH_2 - OH$
2276)	Trivial names of carboxylic acids were taken from their (a) Nature (b) Carbon numbers (c) Sources (d) All of these	(c)	The common names of carboxylic acids were derived from the source from which they are obtained. E.g. $H - COOH$ is named formic acid, derived from Latin word formic



			means 'ant'. The irritation by an ant bite is due to formic acid. Acetic acid was isolated from vinegar, and in Latin vinegar is acetum. Thus acid derived called acetic acid.
2277)	-- C = N group is called (a) alkyl (b) alkyl nitrile (c) Cyanogens (d) Amine	(c)	The CN group is called cyanide or cyanogen. When it is bonded with alkyl radical, then it is called alkyl nitrile.
2278)	By reacting Grignard's reagent with dry ice we get (a) Alkenes (b) Alcohol (c) Carboxylic acid (d) Amide	(c)	$\text{R} - \text{Mg} - \text{X} + \text{O} = \text{C} = \text{O} \xrightarrow{\text{dry ether}} \begin{array}{c} \text{O} \\ \\ \text{R} - \text{C} - \text{O}^{\text{Mg}} \end{array} \xrightarrow{\text{H}^+} \text{R} - \text{COOH}$
2279)	The first three aliphatic acids are (a) Liquids (b) Solids (c) Gases (d) Plasma	(a)	Formic acid, acetic acid and propionic acid are colourless liquids with pungent smell.
2280)	The first three aliphatic carboxylic acids have (a) No smell (b) Irritating (c) Pungent (d) None of these	(c)	Same as above
2281)	From C ₁ to C ₆ all carboxylic acids are (a) Green (b) Grey (c) Yellow (d) Colourless	(d)	C ₁ to C ₆ acids are colourless liquids.
2282)	With the increase in carbon no. the solubility of carboxylic acids. (a) Increases (b) Decreases (c) Remains same (d) None of these	(b)	The solubility of carboxylic acids in water gradually decreases with the increase in molecular mass because the high molecular mass carboxylic acids have less hydrogen bonding with water molecules.
2283)	Carboxylic acids generally exist in cyclic (a) Monomers (b) Dimers (c) Trimers (d) Tetramer	(b)	$\begin{array}{c} \text{O} \text{-----} \text{H} - \text{O} \\ \qquad \qquad \qquad \\ \text{R} - \text{C} \qquad \qquad \qquad \text{C} - \text{R} \\ \qquad \qquad \qquad \\ \text{O} - \text{H} \text{-----} \text{O} \end{array}$ (a dimer of carboxylic acids) due to H-bonding
2284)	The B.P. of acetic acid is	(a)	CH ₃ COOH boils at 118°C i.e. 118 +



	(a) 391 K (b) 118°C (c) Both a and b (d) None	273 = 391K
2285)	M.P has _____ relationship with the carbon in carboxylic acids (a) Direct (b) irregular (c) NO (d) All of these	(b) The melting points of carboxylic acids increase irregularly with the increase in molecular mass. The melting points of carboxylic acids containing even number of C-atoms are higher than the next higher and lower member having odd number of C-atoms
2286)	The M.P. of carboxylic acids containing even number of carbon atoms is _____ than the next (a) Higher (b) Low (c) Equal (d) None	(a) It is because in carboxylic acids, with even number of C-atoms the terminal groups are in trans form, which have less repulsion with the second molecule i.e. greater attractions cause high molecular mass.
2287)	When a carboxylic acid reacts with a metal _____ gas is evolved (a) H ₂ (b) CO ₂ (c) Cl ₂ (d) None of these	(a) Carboxylic acids react with active metals (Na, K, Ca etc.) to form their salts with the evolution of H ₂ gas. $2\text{CH}_3\text{COOH} + 2\text{Na} \rightarrow 2\text{CH}_3\text{COO Na} + \text{H}_2$
2288)	Salt formation from a carboxylic acid is an evidence of _____ bond breaking (a) C --- H (b) O - H (c) COO (d) C - OH	(b) Carboxylic acids furnish H ⁺ ion when dissolved in water. When carboxylic acids treated with bases form salts and water as H ⁺ ions from acid breaks away. $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O}$
2289)	Etherification is catalyzed by (a) Acids (b) Gases (c) Salts (d) None of these	(a) Carboxylic acids when heated with alcohols in presence of conc. H ₂ SO ₄ (mineral acid), ester formed. $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$
2290)	Acetamides are formed by the reaction of carboxylic acids with (a) Acids (b) Base (c) Salts (d) NH ₃	(d) Carboxylic acids react with NH ₃ to form ammonium salts which on heating produce acid amides. $\text{CH}_3\text{COOH} + \text{NH}_3 \xrightarrow{\text{heat}} \text{CH}_3\text{COONH}_4$



			$\text{CH}_3\text{COONH}_4 \rightarrow \text{CH}_3\text{CONH}_2 + \text{H}_2\text{O}$
2291)	Dehydrating agent used for carboxylic acids is	(c)	Carboxylic acids on heating with P_2O_5 are dehydrated to anhydrides.
(a) P_2O_4 (b) PCl_5			$\begin{array}{c} \text{O} \quad \quad \text{O} \\ \text{CH}_3 - \text{C} - \text{O} - \text{H} + \text{H} - \text{O} - \text{C} - \text{CH}_3 \\ \text{O} \quad \quad \text{O} \end{array}$
(c) P_2O_5 (d) PCl_3			$\text{P}_2\text{O}_5 \rightarrow \text{CH}_3 - \text{C} - \text{O} - \text{C} - \text{CH}_3 + \text{H}_2\text{O}$ (acetic anhydride)
2292)	Partial reduction of acetic acid happens with	(b)	$\begin{array}{c} \text{O} \\ \text{CH}_3 - \text{C} - \text{OH} + [\text{H}] \text{LiAlH}_4 \rightarrow \\ \text{CH}_3 - \text{CH}_2 - \text{OH} + \text{H}_2\text{O} \end{array}$
(a) NH_3 (b) LiAlH_4			
(c) $\text{P} + \text{HI}$ (d) PCl_5			
2293)	Complete reduction of a carboxylic acid happens with	(c)	$\text{CH}_3 - \text{COOH} + 6\text{HI} \rightarrow \text{CH}_3 - \text{CH}_3 + 2\text{H}_2\text{O} + 3\text{I}_2$
(a) NH_3 (b) LiAlH_4			
(c) P (d) PCl_5			
2294)	The freezing point of acetic acid is	(d)	Pure acetic acid freezes to an ice like solid at 17°C , therefore it is called glacial acetic acid.
(a) 10°C (b) 15°C			
(c) 13°C (d) 17°C			
2295)	Pick up the strongest acid	A	Formic acid is the strongest acid because of the more stable formate ion. Its stability is due to the no electron donating alkyl group present. If the alkyl groups, are present then conjugate base become destabilized and the acid become weak.
(a) Formic acid			
(b) Acetic acid			
(c) Propanoic acid			
(d) Butanoic acid			
2296)	Which of the following statement is false about acetic acid?	A	Mono-chloroacetic acid due to inductive effect (electron withdrawing effect, -i) is stronger acid than acetic acid.
(a) Acetic acid is stronger acid than mono-chloro acetic acid			
(b) Acetic acid is weaker acid than formic acid			
(c) Acetic acid is weaker than HNO_3			
(d) Acetic acid is weaker acid than HCl			
2297)	Which one of the following is the	D	Due to inductive effect of 3 Cl in



strongest acid?

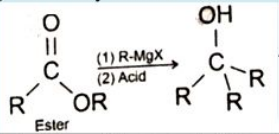
- (a) Acetic acid
- (b) Chloroacetic acid
- (c) Dichloroacetic acid
- (d) Trichloroacetic acid

trichloroacetic acid. It is strongest acid and acidity strength.

Trichloroacetic acid > dichloroacetic acid > chloroacetic acid > acetic acid

2298)	Which compound has the highest boiling point? (a) $CH_3 - CH_3$ (b) CH_3OCH_3 (c) CH_3CH_2OH (d) CH_3COOH	D	Carboxylic acid has higher boiling point because it forms stronger hydrogen bonds (a dimer) with each other which is stronger than hydrogen bonding in alcohol which is in turn stronger than IMF of ether and alkane (non-polar molecule)
2299)	The characteristic reaction of carboxylic acid is (a) Electrophilic addition (b) Electrophilic substitution (c) Nucleophilic addition (d) Nucleophilic substitution	D	The characteristic reaction of carboxylic acid is nucleophile substitution reaction in which the nucleophile (-OH) is substituted by another nucleophile (Nu).
2300)	Formic acid and acetic acid can be distinguished (a) With $NaHCO_2$ (b) With NaOH (c) With Tollen's reagent (d) With the help of litmus	C	Tollen's test is given by molecule containing aldehyde group. As $\begin{array}{c} O \\ \\ CH_3 - C - OH \end{array}$ there is no aldehyde group. It does not give silver mirror on reacting with Tollen's reagent while in formic acid $\begin{array}{c} O \\ \\ H - C - OH \end{array}$. It contains aldehydic functional group so it gives silver mirror on reacting with Tollen's reagent.
2301)	Which one is the most unstable? (a) Ester (b) Amide (c) Acid halide (d) Acid anhydride	C	Acid halide is most unstable because the electronegativity of halogen is high and it is electron withdrawing thus it pulls the electrons towards itself from C-X bond, which makes the carbonyl carbon more electrophilic, this makes nucleophilic attack easier moreover in acid halides there is a very little resonance thus is less stable.
2302)	The hydrolysis of an ester proceeds most slowly under the condition of	C	The hydrolysis of ester is catalyzed by either acid or a base. In a neutral



	(a) High acidity (b) High basicity (c) Neutrality (d) High temperature		condition the reaction proceeds most slowly.
2303)	Which one of the following is the derivative of carboxylic acid (a) Acid – iodide (b) Acid – anhydride (c) Ester (d) All	D	Derivative of carboxylic acid are ester, amide, acid halide, imides and acyl azide.
2304)	Treatment of ester with RMgX from an adduct that on hydrolysis give: (a) $\text{R} - \text{OH}$ (b) $\text{R}_2\text{CH} - \text{OH}$ (c) $\text{R}_3\text{C} - \text{OH}$ (d) $\text{R} - \text{COH}$	C	Esters react with grignard's reagents to give tertiary alcohol 
2305)	Which of the following when react with carboxylic acid produces H_2 gas along with their salt (a) Na (b) K (c) Both a and b (d) None	C	Carboxylic acid reacts with active metals produces their salt along with the evolution of hydrogen gas $\text{CH}_3\text{COOH} + \text{Na} \rightarrow 2\text{CH}_3\text{COONa} + \text{H}_2$ $2\text{CH}_3\text{COOH} + 2\text{K} \rightarrow 2\text{CH}_3\text{COOK} + \text{H}_2$
2306)	Which one of the following is the weakest acid? a. CHCl_2COOH b. CH_3COOH c. ClCH_2COOH d. CCl_3COOH	B	
2307)	CH_3COONa and $\text{CH}_3\text{-COCl}$ react to give a. Acetic acid b. Acetone c. Acetic anhydride d. Sodium formate	C	
2308)	The main product obtained when acetic acid reacts with PCl_5 is a. CH_3COCl b. CCl_3CHO c. CH_3Cl d. CH_3OH	A	



- 2309)** Carboxylic acids have B.pt higher A than alcohols because
- They possess extensive H-bonds
 - Have higher molecular weights
 - Alcohols are not polar
 - None of the above

- 2310)** Acetic anhydride on reaction with C ammonia produces
- Methanoic acid
 - Ethanamine
 - Acetamide
 - None of these

- 2311)** Chlorination of carboxylic acids in B presence of phosphorous produces
- Acetyl chloride
 - A-chloro carboxylic acid
 - B-chloro carboxylic acid
 - Phosphorous acetate

- 2312)** Which one of the following has C highest boiling point?
- Formic acid
 - Acetic acid
 - Propionic acid
 - Ethanol

- 2313)** Carboxylic acid contains D
- Hydroxyl group
 - A hydroxyl and carboxyl group
 - Carboxyl and aldehydic group
 - A carboxyl group

- 2314)** Urea is B
- Carboxylic acid
 - An amide
 - An ester
 - An amino acid

2315)

CHAPTER 21

BIOCHEMISTRY



2316)	Waxes are the esters of fatty acids with high molecular weight. A) Monohydroxy alcohols B) Dihydroxy alcohol C) Trihydroxy alcohol D) All of the above	A
2317)	Oligosaccharides class of carbohydrates contain monosaccharides of about: A) 2 to 8 units B) 2 to 9 units C) 2 to 10 units D) 2 to 11 units	C
2318)	Sucrose on hydrolysis yield: A) Glucose B) Glucose and fructose C) Glucose and maltose D) Maltose and fructose	B
2319)	Lipids are chemically: (a) Acids (b) Alcohols (c) Ethers (d) Esters	D
2320)	Proteins, carbohydrates and fats form three great classes of foodstuffs commonly called: (a) Trivirates (b) Triumvirates (c) Trisvirates (d) All of the above	B
2321)	High molecular mass compound was hydrolyzed the product was analyzed and found to be amino acid. The compound is: (a) Protein (b) Carbohydrate (c) Lipid (d) Vitamins	A
2322)	Polyhydroxy aldehydes or ketones are known as: (a) Carbohydrates (b) Proteins (c) Lipids (d) Vitamins	A
2323)	Sucrose is considered as: (a) Monosaccharides (b) Disaccharides (c) Polysaccharides (d) None of these	B

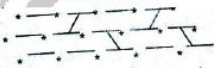


2324)	Sulpholipids are class of compounds that bonds fatty acids, alcohols and carbohydrates. It contains a: (a) Sulphite group (b) Sulphide group (c) Sulphate group (d) bisulphite group	C	
2325)	Secondary structure of proteins is elucidated by which of the following technique? (a) Infrared spectroscopy (b) NMR spectroscopy (c) X-ray diffraction technique (d) All of the above	s	
2326)	How much phosphorus is required by an adult man per day? (a) 500 mg (b) 400 mg (c) 800 mg (d) 1800 mg	C	
2327)	Delayed wound healing is caused by deficiency of: (a) Zn (b) Fe (c) Co (d) Mn	b	
2328)	Oligosaccharides are involved in the formation of: (a) Secreted proteins (b) Blood clotting factors (c) Anti-bodies (d) All of the above	d	
2329)	The molecules of Maltose sugar is given below, it bears: A) Ether linkage B) Peptide linkage C) Ester linkage D) Carbon carbon linkage	A	
2330)	Choose the mineral considered as macronutrient and is essential for human life: A) Iodine B) Iron C) Zinc D) Calcium.	D	
2331)	The large molecules which are formed by the monomers called as	(b)	By built up of small repeating units (monomers) into large molecules, a



- (a) micro molecules
(b) macro molecules
(c) both a and b
(d) none

macromolecules formed e.g.
 $n\text{H}_2\text{C} = \text{CH}_2 \rightarrow [-\text{CH}_2 - \text{CH}_2]_n$
 (macromolecule)

2332)	Macromolecules are classified into (a) Organic (b) Inorganic (c) Both a and b (d) None	(c)	Organic macromolecules =Biopolymers and synthetic polymers, Inorganic macromolecules =Diamond, graphite, sand etc.
2333)	Organic macromolecules are classified into (a) Biopolymers (b) Synthetic polymers (c) Both a and b (d) None	(c)	Biopolymers = Lipids proteins, carbohydrates and nucleic acids =plastics, synthetic fibers, rubber etc.
2334)	Which is not a Biopolymer (a) Lipids (b) Protein (c) Carbohydrate (d) None of these	(d)	Lipids, protein, carbohydrates are bio polymers
2335)	The other name of cross linked polymers is (a) linear polymer (b) branched polymers (c) inter connected polymers (d) none of these	(c)	Cross linked polymers are three dimensional polymers or called as interconnected like 
2336)	A polymer may be (a) Linear (b) Branched (c) Cross Linked (d) All of these	(d)	A polymer is a big molecule built up by repetition of small and simple units (monomers). This repetition is in same cases linear, while in others it is branched or interconnected to form three dimensional structure.
2337)	in macromolecules Dp stands for (a) dissociation parameter (b) dissociation polymer (c) degree of polymerization (d) none of these	(c)	The length of the polymer chain is specialized by the number of repeat units in the chain. This number of repeat units is called degree of polymerization (DP). Polyvinyl chloride a polymer DP 1000 has its molecular mass = 63 x



$$1000 = 63000.$$

2338)	Molecular mass of polymer = Mol. Mass of monomer X _____ (a) 1000 (b) 1 (c) D.P. (d) All of these	(c)	Molecular mass of polymer = molecular mass of repeat unit XDP.
2339)	Mostly the molecular mas of macro molecules ranges between 10,000 to (a) One lac (b) One million (c) One billion (d) One trillion	(b)	Most high molecular mass polymers such as plastics, fiber, rubbers etc. have molecular mass between 10,000 to 1,000,000.
2340)	A polymer may be (a) Homopolymer (b) Co-polymer (c) Terpolymer (d) All of these	(d)	polymers are of three types = homopolymers, Co polymers and terpolymers.
2341)	The polymer which can be re-softened again and again are called. (a) Thermoplastic (b) Thermoseting (c) Both a and b (d) None	(a)	The polymer which can be softened when heated and hardened when cooled repeatedly with a little change in properties is a thermoplastic polymer e.g. pipes, plastic toys.
2342)	The polymers which can not be re-softened again and again are called. (a) Thermoplastic (b) Thermoseting (c) Both a and b (d) None	(b)	The polymers which become hard on heating and cannot be softened again are thermosetting polymers. Such polymers decompose on heating instead of melting. E.g. synthetic varnish, epoxy resins etc.
2343)	Which polymerization is free radical mechanism based (a) Addition (b) Condensation (c) Both a and b (d) None	(a)	Addition polymerization involves initiation propagation and termination steps, which take place by free radical mechanism.
2344)	The temp. and pressure used for PVC polymerization is (a) 10°C and 10 atm (b) 20°C and 20 atm (c) 52°C and 9 atm (d) 100°C and 10 atm	(c)	condition for polyvinyl chloride polymer formation.



2345)	The general formula of carbohydrate is (a) $C_x(H_2O)_y$ (b) C_nH_{2n+2} (c) CH of these (d) None	(a) The name carbohydrate (hydrate of carbon) is derived from the fact that the first compound of this group which was studied had an empirical formula $C_x(H_2O)_y$
2346)	$(CH_2O)_n$ is general formula of (a) monosaccharides (b) oligosaccharides (c) polysaccharides (d) none of these	(a) These are simple sugar which cannot be hydrolysed, have an empirical formula $(CH_2O)_n$ where $n = 3$ or large number e.g. glucose has molecular formula $C_6H_{12}O_6$ or $(CH_2)_6$.
2347)	Monosaccharides are (a) Aldoses (b) Ketoses (c) Either a and b (d) None of these	(c) Aldoses – glucose has an aldehyde group $(CH_2OH(CHOH)_4CHO)$. Ketoses = fructose has keto group O $CH_2OH(CHOH)_3CCH_2OH$.
2348)	Monosaccharides and oligosaccharides are generally called as (a) Crystals (b) Sugars (c) Liquids (d) Non-sugars	(b) glucose, fructose etc. are sugars – these are monosaccharides. sucrose, lactose, maltose are also sugars – these are oligosaccharides.
2349)	Polysaccharides are also called (a) Crystals (b) Sugars (c) Liquids (d) Non-sugars	(d) These are amorphous solids, insoluble in water and tasteless and are called non-sugars such as starch, cellulose etc.
2350)	Glycogen is stored in (a) animals (b) Plants (c) Soil (d) None of these	(a) Animal store glucose in the form of glycogen mainly in liver and muscles. It is also called as animal starch.
2351)	Cotton is _____ % cellulose (a) 90 (b) 100 (c) 99 (d) 30	(c) Cotton is 99% cellular and the woody parts of trees are generally more than 50% cellulose.
2352)	α -D-glucose is a monomer for (a) Starch (b) cellulose (c) glycogen (d) Protein	(a) Natural starch contains 10 to 20% amylase, a polymer of α -D-glucose having glycosidic $C_1 - C_4$ linkage and 80 to 90% amylopectin having $C_1 - C_4$ and $C_1 - C_6$ linkages.



2353)	<i>b</i> -D-glucose is a monomer for (a) Starch (b) cellulose (c) glycogen (d) Protein	(b)	It is a polymer of B-D-glucose consisting of upto 2500 glucose residues joined to each other through b-1→4 linkage.
2354)	A high molecular weight organic materials, which upon hydrolysis give amino acid is called (a) Fats (b) Protein (c) Carbohydrates (d) None of these	(b)	Proteins are the peptides having molecular mass more than 10,000. These are peptides of same or different α-amino acids.
2355)	Protein are classified into (a) simple protein (b) complex protein (c) derived proteins (d) all of these	(d)	Simple proteins = upon hydrolysis yield amino acids or their derivatives e.g. albumin, globulin etc. Compound proteins = these contain some non-protein groups called prosthetic groups such as phosphor protein, Lipoproteins. Derived proteins = these are derived from simple and conjugated protein e.g. proteases enzymes.
2356)	The protein which only yield amino acids are their derivatives (a) Simple proteins (b) Complex proteins (c) Derived protein (d) All of these	(a)	These are albumin, globulin, legumin, collagen etc. legumin and collagen proteins are present in the connective tissues throughout the body.
2357)	When a protein is attached with a non-protein group that non-protein group is called (a) Activator protein (b) Macro- (c) Prosthetic (d) None	(c)	In phosphoproteins the phosphoric acid is the prosthetic group and in lipoproteins, lipid is the prosthetic group.
2358)	The proteins which are derived by conjugated proteins are called as (a) Simple protein (b) Complex protein (c) Derived protein	©	These are proteases enzymes, peptones, oligopeptides, polypeptides.



(d) None		
2359)	Protein may have (a) Primary structure (b) Secondary structure (c) Tertiary structure (d) All of these	(d) Proteins have at least three levels of structural organization and some proteins also possess a fourth structure called quaternary structure.
2360)	The three dimensional folding and twisting of a polypeptide chain give rise to (a) Primary structure (b) Secondary structure (c) Tertiary structure (d) All of these tertiary	(c) It is a tertiary structure of proteins.
2361)	Coiling of zigzagging of polypeptide gives rise to _____ structure (a) Primary (b) Secondary (c) Tertiary (d) None	(b) These chains caused by hydrogen bonding between NH and C = O groups of amino acids near each other in the chains. E.g. b-pleated sheet like DNA etc.
2362)	Ester of fatty acids with glycerol are (a) simple lipids (b) complex lipids (c) Derived lipids (d) Noen	(a) These are common fats and oils with strcutre like $\text{CH}_2 - \text{O} - \text{COR}$ $\text{CH} - \text{O} - \text{COR}$ $\text{CH}_2 - \text{O} - \text{COR}$
2363)	Sterols, vitamin D and terpenese belong to (a) Simple lipids (b) Complex lipids (c) Derived lipids (d) None	(c) These are hydrolytic products of the compound lipids and simple lipids.
2364)	Naturally occurring lipids are called (a) Fats (b) Protein (c) Steroids (d) None	(c) The parent nucleus of steroids has three six membered rings and one five membered ring (17C-atoms). Steroids are cholesterol, ergosterol, male and female sex harmones.
2365)	Which is not a steroid (a) Cholesterol (d)	© Phospholipids do not contain 17 – C nucleus (three six membered rings and one five membered ring).



Ergosterol

(c) Phospholipids (d) None of these

2366)	Which is not an enzyme (a) Transverses (b) Lipase (c) Lyase (d) None of these	(d) All the three are enzymes lipase used for hydrolysis of fats and oils. Transferase bring about exchange of functional group. Lyases catalyse addition of NH_3 H_2O or CO_2 to double bonds or removal of these from double bonds.
2367)	Oxidation reduction is done by (a) Oxidoreductase (b) Lipases (c) Lyase (d) None of these	(a) These catalyse oxidation reduction reactions.
2368)	RNA has _____ instead of _____ in comparison to DNA (a) T and C (b) U and T (c) T and U (d) C and T	(b) In RNA Thymine does not occur and in its place uracil is there.
2369)	Purines include (a) Adenine (b) Guanine (c) Both a and b (d) None	(c) Adenine and guanine are purines.
2370)	When a nitrogenous base combine with a sugar it is called (a) Ribose (b) Nucleotides (c) Nucleoside (d) None	(b) Nitrogenous base-sugar complex called nucleotide units.
2371)	A nucleoside may be (a) Ribonucleoside (b) Deoxyribonucleoside (c) both a and b (d) None	(c) It is a combination of nitrogenous base (purine or pyrimidines) with a sugar (ribose or deoxyribose).
2372)	Which one is rich source of starch: (a) Honey (b) Potatoes (c) Wood (d) Liver	B Honey contain sucrose, Potatoes contain starch, Liver cell contain cellulose + Glycogen
2373)	Honey mainly contains	C Honey contain glucose + Fructose



- (a) Starch
(b) Glucose
(c) Fructose
(d) Sucrose

collectively called sucrose, but fructose is major contributor.

2374)	Which one is monosaccharide (a) Glucose and maltose (b) Fructose and maltose (c) Maltose and sucrose (d) Glucose and fructose	D	Glucose and maltose → mono + Disaccharide Fructose and maltose → mono + disaccharide Maltose and sucrose → disaccharide Glucose + fructose → Monosaccharide same formula ($C_6H_{12}O_6$)
2375)	Which one is disaccharide (a) Glucose and maltose (b) Fructose and maltose (c) Maltose and sucrose (d) Glucose and fructose	C	Maltose and sucrose are disaccharides.
2376)	Which one is polysaccharides (a) Starch (b) Glycogen (c) Cellulose (d) All of these	D	All are composed of many monosaccharide units, joined together and form polysaccharide.
2377)	Which one is call "fuel of life" (a) Carbohydrates (b) Lipids (c) Proteins (d) Fats	A	Carbohydrates are called the fuel of life. Carbohydrate are all about energy and are present in fruits, vegetables, beads, dairy products etc. it produces energy for the body needs.
2378)	An immediate source for sick and sportsmen is (a) Fructose (b) Sucrose (c) Glucose (d) Starch	C	Immediate source of energy is glucose. Pure glucose delivers a faster supply of energy for immediate cognitive boost.
2379)	Used as sweetening agent in confectionary and as a substitute of table sugar for diabetic patients (a) Fructose (b) Sucrose (c) Glucose (d) Starch	A	Fructose does not actually raise blood glucose. Fructose has a lower glycemic index it is used as energy source in diabetes patients because it may aid glycemic control. Also, it is used as a food sweetener.
2380)	Cow milk contain lactose about (a) 4.8% (b) 6.8%	A	Cow milk contain about 4.8% lactose, 3.5% protein.



	(c) 8% (d) 10%		
2381)	100ml blood of normal person contains glucose: (a) 150 – 165 mg (b) 10 – 65 mg (c) 165 – 210 mg (d) 65 – 110 mg	D	Per 100 ml there are 65 – 110 mg of glucose. If the level falls too low then brain can damage.
2382)	A reducing sugar will (a) React with fehling solution (b) Not react with fehling reagent (c) Have fewer calories (d) Always be a ketone	A	Reducing sugar + Fehling's reagent $\xrightarrow{\text{Boiling in water bath}}$ Cu_2O formed (red ppt) + Other product reducing sugar react with oxidizing agent (Fehling's solution) by reducing the copper (II) to copper (I)
2383)	Starch is (a) Mono saccharide (b) Oligosaccharide (c) Polysaccharide (d) All of them	C	Starch is poly saccharide made of large number of monomers.
2384)	The sugar that yields only glucose on hydrolysis is (a) Lactose (b) Sucrose (c) Maltose (d) Fructose	C	Maltose $\xrightarrow{\text{H}_2\text{O}}$ Glucose + Glucose. $\text{C}_{12}\text{H}_{22}\text{O}_{11} \xrightarrow{\text{H}_2\text{O}} 2\text{C}_6\text{H}_{12}\text{O}_6$
2385)	What is the functional group of carbohydrates? (a) Formyl (b) Keto (c) Both of these (d) None of these	C	Carbohydrate is a polyhydroxy having formyl (-CHO) functional group at one end e.g. in glucose or contain keto (R_2CO) functional group e.g. in fructose.
2386)	Glucose is also called (a) Grape sugar (b) Dextrose (c) Blood sugar (d) All of them	D	Grape sugar > because it is present mostly sweet fruits like grapes etc. Dextrose → because it occurs in nature as optically active dextrorotatory isomer. Blood sugar → because small quantity of glucose is also present in human blood and urine.
2387)	Chemical test used to differentiate glucose (reducing sugar) from fructose (non-reducing sugar) is (a) Benedict's test	A	Benedict's reagent can react with a free aldehyde group. Reducing sugar has free aldehyde or ketone group so they react with Benedict's reagent and



	(b) Hoffman's test (c) Carbylamines test (d) Iodine test		the reduction reaction causes the benedict's reagent to change color while non-reducing sugar has no free aldehyde or ketone so benedict's reagent cannot react with it.
2388)	Sugar containing an aldehyde group is (a) Reducing sugar (b) Non-reducing sugar (c) Oxidizing sugar (d) Sweet sugar	A	The carbohydrate which contain aldehyde group is called reducing sugar while carbohydrate which contain keto group is called non-reducing suger.
2389)	The reaction of fats and strong bases to produces glycerols and salt of fatty acids is (a) Hydrogenolysis (b) Saponification (c) Esterification (d) Fermentation	B	Saponification is the hydrolysis of triglyceride by alkalies. Glycerol along with sodium or potassium salts of fatty acids are produced. These Na and K salts are called soaps. $\text{Triglyceride} + 3\text{NaOH} \rightarrow \text{Glycerol} + 3 \text{ salt of fatty acid (Soap)}$
2390)	Which one of the following is not macromolecule? (a) SiO_2 (b) PTFE (c) Bakelitic (d) Sucrose	D	Macromolecules should contain molecular mass more than 10,000. Sucrose is only made of 2 monosacharide. It is not a macromolecule but a dimmer.
2391)	Hydrolysis of vegetable oil gives: (a) Long chaina alcohol (b) Glycerol & fatty acids (c) Glycine (d) Glycol	B	Prosthetic group is a non-peptide (non-protein) parth that attached to protein. They may be organic (vitamin, lipid) or inorganic (metal ion) but is not composed of amino acid.
2392)	Fatty acids are (a) Unsaturated dicarboxylic acid (b) Long chain alkanoic acid (c) Aromatic carboxylic acid (d) Aroamatic dicarboxylic acid	B	Fatty acid is made of a long hydrocarbon chain called tail while the head is carboxylic acid. $\begin{array}{c} \text{O} \\ \\ \text{R}-\text{C}-\text{OH} \end{array}$ where R is a long hydrocarbon chain about from C_4 to C_{40}
2393)	The most intra-cellular macromolecules which almost form more than 50% dry weight of most organisms: (a) Lipids	B	Most abundant organic compound in animal is protein.



	(b) Proteins (c) Glucose (d) Starch		
2394)	Molecular weight of protein contain Nitrogen upto: (a) 5% (b) 10% (c) 16% (d) 23%	C	Protein contains approximately 16% nitrogen by weight.
2395)	Which nitrogenous base is absent in RNA (a) Adanine (b) Guanine (c) Cytosine (d) Thymine	D	In RNA instead of thymine another nitrogenous base uracil is present.
2396)	Nucleotide of DNA and RNA are joined together by (a) Glycosidic linkage (b) Phosphodiester linkage (c) Beta linkage (d) Peptide linkage	B	The reaction between the phosphate group of one nucleotide and the hydroxyl group of another nucleotide through dehydration reaction forming a covalent bond that link the two nucleotides. This linkage is called phosphodiester linkage because the phosphate group is now linked to the two sugar by means of a pair of esters bonds.
2397)	Which of the following linkage is incorrect in DNA (a) Adanine to thymine (b) Guanine to cytosine (c) Adanine to cystosine (d) Both a and b	C	Purine > adenine + Guanine Pyrimidine → thymine + cytosine Adenine + cytosine not possible
2398)	Glycoside linkage is produced between ----- of two monosaccharide a. Aldehyde group and ketones group b. Hydroxyl group and ketene group c. H and aldehyde group d. Hydrogen and hydroxyl group	d	
2399)	Glycoside linkage is formed with condensation of	c	



- a. Methanol molecule
- b. HCl molecule
- c. H₂O molecule
- d. O₂ molecule

2400)	Which is a polysaccharide?	a	
	a. All of the below		
	b. Cellulose		
	c. Starch		
	d. Glycogen		
2401)	The cause of diabetes mellitus is	d	
	a. Sucrose		
	b. Lactose		
	c. Galactose		
	d. None of the above		
2402)	Primary nutritional importance of carbohydrates is	d	
	a. Growth		
	b. Immunity		
	c. Energy		
	d. All of the above		
2403)	Proteins are ----- compounds having greater amount of ----- element(s).	a	
	a. Organic, nitrogen		
	b. Inorganic, nitrogen		
	c. Organic, sulphur		
	d. Organic, sulphur and halogen		
2404)	Smaller units of proteins are linked together by	b	
	a. Amide linkages		
	b. Peptide linkage		
	c. Glycoside linkage		
	d. Phosphate linkage		
2405)	A non-protein group is present in	c	
	a. Derived proteins		
	b. Simple proteins		
	c. Conjugated proteins		
	d. Both a and c		
2406)	Haemoglobin belongs to	c	
	a. Nucleoproteins		
	b. Lipoproteins		
	c. Metallic proteins		
	d. Simple proteins		
2407)	Which one is not related to	b	



aldohexoses?

- a. Aldehyde
- b. Ketone
- c. Six
- d. Sugar

2408) Synthesis of DNA is also known as b

- a. Transcription
- b. Replication
- c. Translation
- d. Transmutation

2409) RNA is primarily seen in b

- a. Nucleus
- b. Cytoplasm
- c. Cell wall
- d. Cell membrane

2410) Specificity of enzyme depends a
upon

- a. Active site
- b. Linear structure
- c. Turn over number
- d. None of these

2411) The best source of iron is a

- a. Organ meat
- b. Milk
- c. Tomatoes
- d. Potato

2412) In which disaccharide the basic a
units are same?

- a. Maltose
- b. Lactose
- c. Sucrose
- d. All of these

2413) In DNA adenine form the c
complementary pair with

- a. Uracil
- b. Cytosine
- c. Thymine
- d. Guanine

2414) The primary structure of protein a
represents

- a. Linear sequence
- b. 3 dimensional structure of
proteins



	c. Helical structure of protein d. Sub units structure of protein e. Sub units structure of protein	
2415)	Liquid form of triglycerides at room temperature are called a. Oils b. Fats c. Solids d. None of these	
2416)	Almost all naturally occurring amino acids are all _____ amino acids (a) a (b) B (c) Both a and b (d) None of these	(a) All naturally occurring amino acids are α -amino acids. These are important because these are the building blocks of proteins, important for human beings – $\text{CH} - \text{COOH}$ NH_2
2417)	Those amino acids which contain two carboxylic groups are called _____ amino acids (a) Acidic (b) Basic (c) Neutral (d) None of these	(a) Aspartic acid has two carboxylic groups $\text{HOOC} - \text{CH}_2 - \text{CH} - \text{COOH}$ it has acidic NH Character.
2418)	Those amino acids which contains two amino group are called (a) Acidic (b) Basic (c) Neutral (d) None of these	(b) Lysine has two amino groups and is overall basic in natural $\text{H}_2\text{N} - \text{CH}_2 - (\text{CH}_2)_3 - \text{CH} - \text{COOH}$ NH_2
2419)	Glutamic acid, aspartic acid are _____ amino acid (a) Acidic (b) Basic (c) Neutral (d) None of these	(a) These contain two carboxylic acid groups thus are acidic in nature.
2420)	Lysine is _____ amino acid (a) Acidic (b) Basic (c) Neutral (d) None of these	(b) It has two NH_2 groups, therefore basic in nature.
2421)	The human body can synthesize _____ amino acids (a) 1 (b) 10 (c) 20 (d) 19	(b) These amino acids which human body can synthesize are called non-essential amino acids.



2422)	The amino acids which human body can synthesize are called _____ amino acid (a) Essential (b) Non essential (c) Acidic (d) Basic	(b)	Same as above.
2423)	The amino acids which human body cannot synthesize are called _____ amino acid (a) Essential (b) Non essential (c) Acidic (d) Basic	(a)	The essential amino acids must be supplied to our bodies through our diet because they are essential for proper health and growth. Their deficiency in the body may causes diseases.
2424)	Tyrosine was isolated from (a) Butter (b) Cheese (c) Oils (d) Fats	(b)	In Greek the word 'tryos' means cheese so the amino acid derived from cheese is named as tyrosine.
2425)	Abbreviation of each amino acid consists of _____ three letters of its common name (a) Last (b) First (c) Middle (d) None	(b)	The abbreviation used for Glycine is 'Gly', for Alanine ($\text{CH}_3 - \text{CH} - \text{COOH}$) is 'ala', the NH_2 First three letters.
2426)	Pro stands for (a) Valine (b) Alanine (c) Glycine (d) Proline	(d)	Proline is a neutral amino acid with formula $\begin{array}{c} \text{CH}_2 \quad \text{CH}_2 \\ \quad \\ \text{H}_2\text{C} \quad \text{CH} - \text{COOH} \\ \\ \text{NH} \end{array}$ It has one carboxylic acid and one NH group.
2427)	Zwitter ion is _____ ion of an amino acid (a) Polar (b) Monopolar (c) Dipolar (d) Non-polar	(c)	Amino acid exists as Zwitter ion which has a positive as well as negative ends within the same molecule, thus called as dipolar ion. $\text{R} - \text{CH} - \text{COOH} = \text{R} - \text{CH} - \text{COO}^-$ $\text{NH}_2 \quad \quad \text{NH}_3^+$ Zwitter ion.
2428)	The Zwitter ion is also called (a) International salt	(b)	The dipolar structure of Zwitter ion is also called as internal salt. Almost all



	(b) Internal salt (c) No salt (d) None of these	a-amino acids exist largely in dipolar ionic forms. It has a positive and an negative part, so is called a salt.
2429)	When hydrogen cyanide is added to an aldehyde in the presence of ammonia it is called (a) Strecker synthesis (b) Corey house synthesis (c) Williamson's synthesis (d) None of these	9a) The Strecker synthesis is used to synthesize a-amino acid as given here $\text{RCHO} + \text{HCN} + \text{NH}_3 \rightarrow \text{R} - \underset{\text{CN}}{\text{CH}} - \text{NH}_2$ a-amino nitrite. The a-amino nitrite upon acidic hydrolysis yields an a-amino acids. $\text{R} - \underset{\text{COOH}}{\text{CH}} - \underset{\text{NH}_2}{\text{CH}} \xrightarrow{\text{H}_3\text{O}^+} \text{R} - \underset{\text{COOH}}{\text{CH}} - \underset{\text{NH}_2}{\text{CH}} - \text{NH}_2$
2430)	With amino acids ninhydrin solution gives (a) Blue (c) Bluish violet (b) Violet (d) White	(c) Ninhydrin reacts with amino acids to form an intensely coloured bluish violet product. It is sprayed to analyse amino acids separated by paper chromatography.
2431)	The condensation of two amino acids gives rise to _____ bond. (a) Hydrogen (c) Triple (b) Peptide (d) Double	(b) Peptides are the compounds formed by the condensation of two or more same or different a-amino acids. $\text{H}_2\text{N} - \underset{\text{R}}{\text{C}} - \text{COOH} + \text{H} - \underset{\text{R}}{\text{NH}} - \text{CH} - \text{COOH}$ $\xrightarrow{-\text{H}_2\text{O}} \text{H}_2\text{N} - \underset{\text{R}}{\text{CH}} - \underset{\text{O}}{\underset{\text{ }}{\text{C}}} - \text{NH} - \underset{\text{R}}{\text{CH}} - \text{COOH}$ Peptide bond
2432)	Peptides having molecular mass up to 10,000 is called (a) Protein (c) Mono peptide (b) Polypeptide (d) Dipeptide	(b) Depending upon the number of amino acids per molecule, the peptides are called dipeptides, tripeptides, polypeptides etc. the peptide bonds can continue. And peptide having a molecular mass upto 10,000 is called



a polypeptide.

2433)

CHAPTER 22

INDUSTRIAL CHEMISTRY

2434)	Polyester resin-polyurethane resin is: A.Hot adhesive B.Multipart adhesive C.One part adhesive D.Contact adhesive	B	
2435)	Which of the following is not a polymer? (a) Urea (b) Starch (c) Polythene (d) Natural rubber	B	
2436)	Which of the following statement is NOT true? (a) Natural rubber is hydrocarbon (b) Natural rubber is isoprene (c) Natural rubber is polymer of 1, 3 Butadiene (d) Natural rubber can be vulcanized	B	
2437)	Polymerization is a process of producing: (a) High molecular weight compounds from monomers (b) Low molecular weight compounds from monomers (c) Intermediate molecular weight compounds from monomers (d) High molecular weight compounds from polymers	A	
2438)	Which of the following is not a polymer? (a) Plastic (b) Petroleum (c) Starch (d) Natural rubber	A	
2439)	The widely used PVC is	C	



polymerized product of;

(a) $\text{CH}_2 = \text{CH}_2$ (b) $\text{CH}_2 = \text{CCl}_2$

(c) $\text{ClCH}_2 = \text{CH}_2\text{Cl}$ (d) $\text{CH}_2 = \text{CHCl}$

2440)	The formation of PVC from vinyl chloride is an example of:	B
	(a) Substitution reaction (b) addition polymerization (c) condensation polymerization (d) condensation reaction	
2441)	Which is not correct about polyvinyl chloride? (a) It is used in large scale production of cable insulator (b) It is a copolymer (c) It is a homopolymer (d) It is used in the manufacturing of pipe.	B
2442)	Styrene is polymerized at high temperature of about 600°C in the presence of a catalyst: (a) Iron oxide (b) Platinum gauze (c) Iridium (d) Nickel	A
2443)	Vinylacetate monomer is prepared by the reaction of acetaldehyde and acetic anhydride. The catalyst employed is: (a) FeCl_3 (b) Al_2O_3 (c) V_2O_5 (d) Cr_2O_3	A
2444)	Polyamides are class of condensation polymers by a chemical reaction between: (a) Monocarboxylic acid and diamines (b) Dicarboxylic acids and diamines (c) Dicarboxylic acids and simple amines (d) All of the above	C
2445)	Which of the following is a	A



condensation polymer?

(a) Nylon 6,6 (b) Teflon

(c) Polypropylene (d) Orlon

2446)	Choose the correct statement: (a) The aliphatic polyamides are generally known as Nylons (b) The aliphatic polyamides are generally known as Polyester (c) The aliphatic polyamides are generally known as Epoxy Resins (d) None of the above	A	
2447)	Nylon-6, 6 is obtained from: (a) adipic acid and hexamethylenediamine (b) tetrafluoroethylene (c) vinyl cyanide (d) vinyl benzene	A	
2448)	Which one of the following polymers contains nitrogen? (a) PVC (b) Teflon (c) Nylon (d) polypropylene	C	
2449)	Super phosphate is made by: (a) the acidulation of phosphate rock (b) the alkylation of phosphate rock (c) The alcoholation of phosphate rock (d) The alkali addition with phosphate rock	A	
2450)	Which one is not a nitrogenous fertilizer? (a) Ammonium nitrate (b) Triple phosphate (c) Urea (d) Nitro phosphate	B	
2451)	Which is the correct formula of ammonium carbamate? (a) H_2NCONH_2 (b) $\text{NH}_4\text{COONH}_4$ (c) $\text{H}_2\text{NCOONH}_2$ (d)	D	



2452)	The conversion of carbonate to urea is: (a) Slow and exothermic (b) Fast and exothermic (c) Slow and endothermic (d) Fast and endothermic	C
2453)	Which is not a raw material for the production of cement? (a) CoCO_3 (b) CaCO_3 (c) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (d) Clay	A
2454)	The formula $\text{CH}_3(\text{CH}_2)_{16}\text{COO}^- \text{Na}^+$ represents a member of the class of compound which are known as: (a) Steroids (b) Soaps (c) Carbohydrates (d) Vitamins	B
2455)	Paper is biodegradable material. It produces gas whose emission is environmentally objectionable. Which is that gas? (a) CO_2 (b) SO_2 (c) CH_4 (d) NO_2	C
2456)	In auto mobiles ethylene glycol is used to prevent: (a) Freezing of water in cold winter (b) Boiling of water in hot summer (c) Drying up radiator (d) Both (a) & (b)	D
2457)	The polymer which contain nitrogen is: (a) Polyethylene (b) Polyester (c) Teflon (d) Nylon	D
2458)	The main components of lipstick are: (a) Mixture of non-volatile oil and solid wax (b) Mixture of volatile oil and wax (c) Fats and wax (d) Fates, oil and	D



	wax		
2459)	Nylon (6,6) Six carbon atom in each monomer is the example of: A .Addition polymers B.Substitution polymers C. Condensation polymers D.Condensation monomers	C	
2460)	Which of the following is chromophore? (A) $-\text{NO}_2$ (B) $-\text{SO}_3\text{H}$ (C) $-\text{OH}$ (D) $-\text{COOH}$	A	Chromophore is the protion of a molecule's structure which absorbs visible light photon, causing the molecule to have a colour. Nitro group is a chromophore because its presence in a compound gives yellow color to the compound. Other chromophores are ethylene, acetylene, carbonyls, nitrile groups etc.
2461)	Which of the following is an auxochrome? (a) $-\text{N}=\text{O}$ (b) $-\text{NO}_2$ (c) $-\text{N}=\text{N}-$ (d) $-\text{OH}$	D	A saturated group with non-bonded electrons when attached to a chromophore, alters both the wavelength and intensity of an absorption mean it modifies the ability of that chromophore to absorb light e.g. $-\text{OH}^-$, $-\text{NH}_2-\text{CHO}$ and $-\text{SCH}_3$ $\Rightarrow$ Nitrobenzene is yellow in color due to $-\text{NO}_2$ (Chromophore) but p-hydroxy niro benzene is deep yellow due to $-\text{OH}$ (auxochrome) the natural wavelength of chromophore is modified and the colour chane.
2462)	The reason why material appear colored is (a) The selective absorption of spectral colors (b) The interaction between the light and the electrons of the dye molecules (c) The composition of the light from various spectral colors (d) All of these	D	These are the reason due to which a material appeard coloured.
2463)	Which one is the major components of nail polish remover?	A	Acetone is the major compound of nail polish remover.



- (a) Acetone
- (b) Ethanol
- (c) Propane
- (d) Ethane

2464)	Which of the following is not a pesticide? (a) Dichloro diphenyl trichloro ethane (b) Lead arsenite $\text{Pb}(\text{AsO}_4)_2$ (c) Ammonium nitrate NH_4NO_3 (d) None of them	C	Ammonium nitrate is a fertilizer which enhance plant growth and provides a ready supply of nitrogen. It not behaves as a pesticide.
2465)	Which of the following is/are pesticides? (a) Herbicide (b) Insecticide (c) Nemotocides (d) All of them	D	Pesticides are chemicals that may kill slugs, snails, bacteria, insects, fungus, weeds etc. herbicides, insecticides and nematocides are pesticides.
2466)	PVC is a (a) Additional polymer (b) Condensation polymer (c) Both a & b (d) None of these	A	PVC is additional polymer produced by additional polymerization with no byproduct.
2467)	The half life of DDT is (a) 10 – 15 years (b) 20 years (c) 80 years (d) 100 years	A	The half-life of DDT is 10 – 15 years.
2468)	What is the monomer of Nylon 6,10? (a) Hexamethylene diamine (b) Sebacyl chloride (c) Decanedioyl chloride (d) All of these	D	Nylon 6, 10 is made from two monomers. One contains 6 carbon atoms the other contain 10 carbons. They are sebacyl chloride (decanedioyl chloride) and hexamethylene diamine.
2469)	The example of addition polymerization? (a) PVC (b) Polythene (c) Nylon 6,6 (d) Both a and b	D	Polymer is produced either by addition polymerization or condensation polymerization. PVC and polyethene are produced by addition polymerization with no by product.
2470)	The final residue (with carbon number > 30 per molecule) is a blakish coal tar is called: (a) Asphalt	D	All these contain more than C_{30} . Pitch is considered to be more solid, asphalt is sticky, highly viscous liquid or semi liquid.



	(b) Pitch (c) Bitumens (d) All of these		
2471)	Nylon 6,6 is a (a) Homopolymer (b) Copolymer (c) Terpolymer (d) Addition polymer	B	Nylon 6,6 is a co-polymer. It is a polyamide formed by the reaction of adipic acid with hexylenediamine co-polymer is one that formed by two different monomer.
2472)	Polymer which is formed by the combination of two monomers, adipic acid (hexanedioic acid) and hptamethylene diamine is (a) Nylon 6,6 (b) PVC (c) PVA (d) Nylon 6,7	D	Nylon 6,7 is made by the reaction of adipic acid and heptomethylene diamine. While nylon 6,6 is made by the reaction of adipic acid and a hexylenediamine.
2473)	Which one is used in imitation of leathers (a) PVC (b) Starch (c) Cellulose (d) Silica	A	The fabric is given an imitation leather finish and texture with wax, dye, PVC etc.
2474)	In which of the following polymer the empirical formula is same that of monomer. (a) PVC (b) Backelite (c) Nylon 6,6 (d) None	A	In addition polymerization the empirical formula of the polymer is samethat of monomer. PVC is an addition polymer as C_2H_3Cl (monomer) $(C_2H_3Cl)_n$ vinyl chloride Poly vinyl chloride (PVC)
2475)	Polymer of chloroethylene is (a) Terylene (b) PVC (c) Teflon (d) Nylon	B	$[-CH_2-CHCl-]_n$ Poly chloroethylene is known as poly vinyl chloride (PVC). Chloroethylene are monomers of PVC.
2476)	Polymerization accompanied by the loss of a small by-product molecule. E.g. NH_3 , H_2O is _____ polymer. (a) Additional (b) Anionic (c) Cationic (d) Condensational	D	Condensation polymers are polymers formed by condensation reaction where molecules are joined together by losing small molecules as by product.
2477)	Plasticizer used nail polish is	C	Plasticizers in nail polish used is



- (a) Butyl acetate and ethyl acetate
(b) Acetone and benzene
(c) Camphor
(d) Benzophenone-I

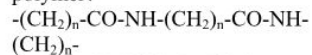
camphor which is used for flexibility

2478)	Nail polish mainly made of _____ dissolved in solvent (a) Nitrocellulose (b) Castor (c) Erythrosine (d) Wax	A	Nail polishes are made up of nitrocellulose dissolved in a solvent like butyl acetate or ethyl acetate.
2479)	Nail polish remover normally contains (a) Toluene (b) Acetone (c) Benzene (d) All of these	B	The acetone is used as a polish remover besides its other organic solvents are also used.
2480)	Artificial nails are made of (a) Acrylic (b) Nitrocellulose (c) Para-substituted aniline (d) Camphor	A	Artificial nails are made up of acrylic it is a thin film forming substance. Acrylic is a transparent plastic material with outstanding strength, stiffness and optical clarity. It is poly (methyl methacrylate).
2481)	Non-acetone nail polish remover consists of (a) Ethyl acetate (b) Ammonia (c) H_2O_2 (d) Toluene	A	The non-acetone nail polish remover contains ethyl acetate. It is used to remove nail polish from artificial nails.
2482)	Acetone is a common solvent used to remove a. Lipstick applied b. Hair dyes c. Adhesives d. Nail polish	D	
2483)	All contain a coloring agent except a. Nail polish b. Lipstick c. Adhesive d. Hair dye	C	
2484)	The condensation polymer among the following is a. PVC	D	



- b. Polythene
- c. Polystyrene
- d. Protein

2485) Which two molecules can be condensed to form the following polymer?



- a. $\text{HOOC-(CH}_2\text{)}_n\text{-COOH} + \text{N}_2\text{H-(CH}_2\text{)}_n\text{-OH}$
- b. $\text{HO-(CH}_2\text{)}_n\text{-OH} + \text{NH}_2\text{-(CH}_2\text{)}_n\text{-COOH}$
- c. $\text{HOOCH-(CH}_2\text{)}_n\text{-COOH} + \text{H}_2\text{N-(CH}_2\text{)}_n\text{-NH}_2$
- d. $\text{HO-(CH}_2\text{)}_n\text{-OH} + \text{HO-(CH}_2\text{)}_n\text{-OH}$

2486) Polymerization of unsaturated monomers produce addition polymers. Which addition polymer has the monomer $\text{CH}_2=\text{CH}_2$ in it?

- a. Polyvinyl chloride
- b. Polyethylene
- c. Polystyrene
- d. All of the above

2487) Nylon a condensation polymer produced by condensation of dicarboxylic acids and a diamines. Nylon 6.6 is produced by

- a. $\text{H}_2\text{N-(CH}_2\text{)}_6\text{-NH}_2 + \text{HOOC-(CH}_2\text{)}_6\text{-COOH}$
- b. $\text{H}_2\text{N-(CH}_2\text{)}_6\text{-NH}_2 + \text{HOOC-(CH}_2\text{)}_4\text{-COOH}$
- c. $\text{H}_2\text{N-C}_6\text{H}_4\text{-NH}_2 + \text{HOOC-C}_6\text{H}_4\text{-COOH}$
- d. None of these

2488) Which one of the following is not a condensation polymer?

- a. Nylon 6,6
- b. Polyethylene terephthalate
- c. Bakelite
- d. None of these

2489) Mauve is an example of

- a. Acidic



- b. Basic
- c. Direct
- d. Azo

2490)	Which one is true for DDT? It is a. Not a pollutant b. An antibiotic c. An antiseptic d. None-degradable pollutant	D	
2491)	Which one is not petrochemicals? a. Diesel oil b. Gasoline c. Kerosene oil d. Table salt	D	
2492)	What is called black gold? a. Polythene b. Petroleum c. Coal tar d. Natural gas	B	
2493)	Petrochemicals are used in the manufacture of a. Polythene b. Detergents c. Fibers d. All of these	D	
2494)	CHAPTER 23 ENVIRONMENTAL CHEMISTRY		
2495)	If CO ₂ level increase from the normal level, what will happen? A. Decrease in sea level B. Increase in sea level C. Longer winter season D. Daytime will increase	B	
2496)	Catalytic converter reduces the emission of ; A) Unburnt hydrocarbons B) CO C) NO D) All of the above	D	
2497)	What is the colour of oxidizing smog?	A	



- A. Reddish brownish grey
B. Bluish brownish grey
C. Brownish grey
D. Yellow

2498)	Which one of the following terms is not related to pollution? A) Noise B) Air C) Radiation D) None of the above.	D
2499)	Which has the lowest temperature? (a) Troposphere (b) Stratosphere (c) Mesosphere (d) Thermosphere	C
2500)	Rain water becomes acidic, when the pH-value of rain water becomes. (a) Greater than 6 (b) Greater than 6.5 (c) Less than 5.6 (d) Less than 5	C
2501)	In lower atmosphere, ozone has adverse effects due to its role in the formation of: (a) CO ₂ (b) NO ₂ (c) Fog (d) Photochemical smog	D
2502)	What is the most important source of water pollution in Pakistan. (a) industries (b) transportation (c) mining industry (d) agricultural and municipal wastage	A
2503)	Commonly used coagulant used for the purification of water is: (a) Ca (NO ₃) ₂ (b) MgCl ₂ (c) Al ₂ (SO ₄) ₃ (OH) ₂ (d) Ca	C
2504)	Dinking water should be odorless, tasteless and live from turbidity and its pH should range between: (a) 6.0 to 7.0 (b) 7.0 to 8.5	B



	(c) 4.5 to 6.0	(d) 8.5 to 9.0	
2505)	Out of the following which treatment is mostly used to kill the disease causing bacteria and other pathogens in water? (a) ozonation (b) UV irradiation (c) chlorination (d) boiling	C	
2506)	Which metal's presence in fish was responsible for the Minimata disease in Japan? (a) Lead (b) Copper (c) Mercury (d) Cadmium	C	
2507)	Thermal processing of industrial waste material aims at: (a) Burning of waste material in pits (b) Converting the solid waste into useful products by thermal treatment. (c) Energy recovery from organic matter prior to its final disposal (d) Size reduction and compaction by thermal process	C	
2508)	Hydrolysis of Al_4C_3 gives; (a) CH_4 (b) C_2H_6 (c) C_3H_4 (d) C_4H_{10}	A	
2509)	When the nitrates of Na, Li, Ca and Sr were heated strongly in separate containers, all of them gave reddish brown colour EXCEPT the nitrate of: (a) Na (b) Ca (c) Sr (d) Li	A	
2510)	Aspirin is produced by heating salicylic acid with: (a) Phenol in the presence of Sulphuric acid. (b) Dentoic anhydride in the presence of phosphoric acid (c) Methyl alcohol in the presence of sulphuric acid. (d) Acetic anhydride in the presence of sulphuric acid	D	



2511)	Acids are classified as monoprotic or polyprotic which of the following is a polyprotic acid? (a) $\text{CH}_3\text{CO}_2\text{H}(\text{aq})$ (b) $\text{HOCl}(\text{aq})$ (c) HCHO_2 (d) H_2CO_3	d	
2512)	Water is said to be permanently hard when it contains: (a) carbonates of Ca^{2+} and Mg^{2+} ions (b) Bicarbonates of Ca^{2+} and Mg^{2+} ions (c) sulphates of Na^{+} and Mg^{2+} ions (d) chlorides of Ca^{2+} and Mg^{2+} ions	D	
2513)	Acetic anhydride is obtained with acetyl chloride in the reaction with; (a) P_2O_5 (b) H_2SO_3 (c) CH_3COONa (d) CH_3COOH	C	
2514)	An organic compound after fusion with sodium gives white precipitate when concentrated nitric acid and then silver nitrate solution was added to the filtrate. The compound is likely to be: (a) $\text{CH}_3\text{CH}_2\text{CHO}$ (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (c) $\text{CH}_3\text{CH}_2\text{COOH}$ (d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$	D	
2515)	Warmer water at 4°C is: (a) Lighter (b) Highest (c) Heavier (d) Heaviest	D	
2516)	The silky finish of mercerized cotton is obtained by treating cotton with a solution of: (a) NaOH (b) NaHCO_3 (c) Na_2CO_3 (d) $\text{Na}_2\text{CO}_3\cdot\text{H}_2\text{O}$	A	
2517)	When treated with ammoniacal cuprous chloride, which of the following forms copper derivatives?	C	



- (a) C_2H_6 (b) C_2H_4
(c) C_2H_2 (d) C_6H_6

2518)	The major sources responsible for the presence of NO, N_2O , NO_2 in the atmosphere is / are: (a) Fertilizers (b) Biological decay of deadly organism (c) Fossil fuel combustion d) All of these	D	
2519)	Which statement is correct for three way catalytic converter: (a) Reduces emission of unburnt HC's (b) Reduces pollutants (c) Oxidize pollutant like CO (d) All of the above	D	
2520)	Which is not a component of environment? (a) Biosphere (b) Lithosphere (c) hydrosphere (d) none of these	(d)	All these are component of environment alongwith atmosphere.
2521)	Which gas is not a constituent of atmosphere? (a) Xe (b) O_3 (c) H_2 (d) F_2	(d)	F_2 is not present in atmosphere as it is very much reactive it is present in minerals in combined state.
2522)	Oceans cove _____ percent of the surface of the earth (a) 60 (b) 70 (c) 80 (d) 97	(d)	Although water is in abundance but because of high salt contents this water cannot be used for human consumption.
2523)	The fresh water is only _____ percent of total water (a) 1 (b) 3 (c) 5 (d) 7	(a)	Only 1% of the total earth's water resource are available as fresh water (surface water, river, lake steam and ground water).
2524)	The rigid rocky crust of earth which extent to 100 km depth is called (a) hydrosphere (b)	(b)	99.5% mass of lithosphere is made of 11 elements which are O, Si, Al, Fe, Ca, Na, K, Mg, Ti, H and P. the



	lithosphere (c) biosphere atmosphere	(d)	element present in trace amounts are C, Mn, S, Ba, Cl, Cr, F, Zr, Ni, Sr and V.
2525)	The region of earth capable of supporting life is (a) hydrosphere lithosphere (c) biosphere atmosphere	(b) (d)	(c) It includes lower atmosphere, the oceans, river, lakes, soils and solid sediments that actively inter change material with all types of living organisms i.e human beings, animals and plants.
2526)	Ecosystem is a smaller unit of (a) hydrosphere lithosphere (c) biosphere atmosphere	(b) (d)	(c) It consists of community of organisms and there interaction with environment i.e. animals, plants and micro organisms.
2527)	The 99.5% mass of the lithosphere is made up of _____ (a) 1 (c) 90	(b) 11 (d) 27	(b) Elements are O, Si, Al, Fe, Ca, Na, K, Mg, Ti, Han P.
2528)	A pollutant affects (a) Human health (b) Quality of life (c) Functioning of ecosystem (d) All of these	(d)	LI these systems are affected by pollution.
2529)	Hydrocarbons, SO ₂ , CO, NH ₃ nitrogen oxides and compounds of fluorine are called (a) Primary pollutant (b) Secondary pollutant (c) Tertiary pollutant (d) None of these	(a)	These are the waste products given out from the chimney of industrial units and exhausts of automobiles.
2530)	Fuel burning i.e. motor vehicles, railways and air crafts give _____ % of CO in atmosphere (a) 10	(b) 25	(d) These are major sources of CO in atmosphere.



	(c) 50	(d) 75	
2531)	Exposure to CO results in (a) Headache (b) Fatigue (c) Unconsciousness (d) all of these	9d)	CO causes all these problems if it is exposed for longer time.
2532)	NO and NO ₂ gases in atmosphere are represent by (a) NO (b) NO ₄ (c) NO _x (d) N _x O _y	(c)	These are NO and NO ₂
2533)	On global scales most of SO ₂ is produced by volcanoes, i.e. (a) 50% (b) 60% (c) 67% (d) 80%	(c)	It is a primary pollutant in the atmosphere.
2534)	Methane's mean residence time is about (a) 3 – 5 years (b) 3 – 7 years (c) 3 – 9 years (d) 2 – 10 years	(b)	It is its residence time in the atmosphere.
2535)	The other name for acid rains is (a) Acid fall (b) Acid deposition (c) Acid adsorption (d) None	(b)	Another name for acid rain.
2536)	CO ₂ makes _____ acid rains (a) Carbonic acid (b) Sulfuric acid (c) Nitric acid (d) All of these	(a)	CO ₂ in the atmosphere makes the natural rain carbonic acid $\text{CO}_{2(g)} + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$
2537)	SO ₂ makes _____ acid rains (a) Carbonic acid (b) Sulfuric acid (c) Nitric acid (d) All of these	(b)	$\text{SO}_2 + 1/2\text{O}_2 + \text{H}_2\text{O}$ Hydrocarbon, smoke, metal acides $\rightarrow \text{H}_2\text{SO}_4$
2538)	NO _x makes _____ acid rains (a) Carbonic acid (b) Sulfuric acid (c) Nitric acid (d) All of these	(c)	$4\text{NO}_2 + \text{O}_2 + 2\text{H}_2\text{O} \rightarrow 4\text{HNO}_3$
2539)	Acid rain may leach metals like (a) Al (b) Hg	(d)	Acid rain can leach the metal like Al, Hg, Pb and Ca



(c) Pb (d) All of these

2540)	The smoke which has high contents of SO_2 is called _____ smoke (a) Reducing (b) Oxidizing (c) White (d) Black	(a)	Smoke containing high content of SO_2 is chemically reducing in nature.
2541)	The smoke having high contents of ozone is called _____ smoke (a) Reducing (b) Oxidizing (c) White (d) Black	(b)	It is yellowish brownish grey haze (a thin mist).
2542)	The main reactant of photochemical smoke is (a) NO (b) Un-burnt hydrocarbon (c) Both a and b (d) None of these	(c)	NO is oxidized to NO_2 within minutes to hours.
2543)	The amount of ozone in atmosphere is expressed in a) g/dm^3 (b) Dobson units (c) g/litre (d) all of these	(b)	Unit for ozone. The normal amount of overhead ozone is about 350DU.
2544)	When chlorofluoro carbon are subjected to U.V. they form (a) Cations (b) Anions (c) Free radicals (d) None of these	(c)	When these are subjected to UV radiations generate C1 Free radicals.
2545)	Which is not caused due to water pollution (a) Dysentery (b) Typhoid (c) Hepatitis (d) None of these	(d)	All these disease spread due to polluted water.
2546)	Polycyclic aromatic hydrocarbons are taught to be (a) disinfectant (b) carcinogenic	(b)	These are carcinogenic even at very low concentrations.



	(c) Helpful	(d) Reactive		
2547)	Industrial effluents have toxic synthetic organic compounds as well as heavy metals like (a) Pb (c) Hg these	(b) Cr (d) All of these	(d)	These industrial pollutants contain heavy metals like Pb, Cd, Cr, Hg, As, Sb etc.
2548)	Chromium (VI) is highly toxic and can cause (a) Blindness Cancer (c) Liver problems	(b) (d) Blood problems	(d)	Cr(VI) is highly toxic used by leather tanneries.
2549)	Which heavy metals do not have any safe limits (a) As (c) Cr	(b) Hg (d) All of these	(d)	The heavy metal Pb, Cd, Cr, As, Hg etc. are highly toxic and cause health problems in any concentration.
2550)	If the D.O. value is less than 4 ppm then water is (a) Polluted (c) Safe of these	(b) Non polluted (d) None	(a)	The concentration of dissolved O ₂ ranges from 4 – 8 ppm, which is a parameter to determine the quality of water.
2551)	The capacity of organic matter in natural water to consume oxygen with period of five days is called (a) D.O. (c) C.O.D these	(b) B.O.D. (d) None of these	(b)	It is biochemical oxygen demand. The value of BOD is the amount of O ₂ consumed as a result of biological oxidation of dissolved organic matter at the beginning and after 5 days.
2552)	The organic content of water which consumes oxygen during chemical oxidation is called (a) D.O. (c) C.O.D these	(b) B.O.D. (d) None of these	(c)	Value of COD is a direct measure of chemically oxidizable matter in water determined directly by treating water with Cr ₂ O ₇ ²⁻ ions. Higher values of Cod will indicate more pollution.
2553)	Which is not method of purification of water		(b)	The municipal solid waste is mainly disposed off by dumping it in a



- (a) Aeration (b) Landfill landfill.
(c) Coagulation (d) Aeration, coagulation, and
Chlorination chlorination and the methods of
purification of water.

2554)	Which is not a method for solid waste management? (a) Landfill (b) Incinerating (c) Recycling (d) None of these	(d) All these are the methods for solid waste management.
2555)	Which gases are produced from landfills? (a) NH_3 (b) H_2S (c) N_2 (d) All of these	(d) Gases produced in land fills are CH_4 , NH_3 , H_2S and N_2
2556)	In incinerating the waste is burnt at (a) 1000°C (b) 100°C (c) 2000°C (d) 1500°C	(a) The burning in the incinerator consumes all combustible material leaving behind non-combustible materials and the residues.
2557)	The recycling process is not done by (a) reprocessing (b) Incineration (c) Depolymerization (d) Transformation	(b) It is burning of the waste at temperatures between 650 to 1100°C . The recycling of plastics is done by reprocessing, depolymerization or transformations.
2558)	The cracking of poly ethylene to make lubricants is a part of _____ process (a) reprocessing (b) Incineration (c) Depolymerization (d) Transformation	(d) It is a process in which used plastics are converted into low quality substances e.g. cracking of poly ethylene gives monomers used for manufacturing of lubricants.
2559)	The region of atmosphere which chiefly consists of ions is/are _____ also called ionosphere): (a) Troposphere (b) Stratosphere (c) Mesosphere (d) Thermosphere	C Thermosphere also called ionosphere is ionized by the solar radiation. It consists of ion mainly.
2560)	The coldest and hottest part of B	The thermosphere is the hottest part



	atmosphere are respectively: (a) Thermosphere & mesosphere (b) Mesosphere & thermosphere (c) Stratosphere & troposphere (d) Troposphere & stratosphere		because it absorbs much of the heat energy from sun like X-Rays, UV. The mesosphere is cold because the air is thin. It contains fewer air molecules to absorb the incoming electromagnetic radiations. CO ₂ in this layer also keeps this layer cool due to radiative emission.
2561)	Air is polluted by (a) Toxic materials (b) Hydro carbon (c) Harmful gases (d) All of them	D	These all are the sources of air pollution
2562)	The substance which adversely affects the human health is called? (a) Atmosphere (b) Ecosphere (c) Pollutant (d) Ecosystem	C	Pollutants effect the human health directly or indirectly.
2563)	Which one is not the property of CO? (a) Help in photosynthesis (b) Lighter than air (c) Water soluble (d) Highly toxic	A	CO is not responsible for photosynthesis. It is CO ₂ which is used in photosynthesis.
2564)	Sources of sulfur dioxide in atmosphere are (a) Combustion of fossil fuels (b) Household activities (c) Municipal wastes (d) Sea spray	A	Combustion of fossil fuel which is a source of SO ₂ that pollute the air.
2565)	Oxides of nitrogen are mainly produced due to (a) Combustion of oil (b) Combustion of coal (c) Combustion of natural gas (d) All of these	D	All of these are the sources of production of NO _x .
2566)	Air pollution adversely affects human health, animals, vegetation, and materials as well as causes climatic changes. Pick up the major air pollutant of the following: (a) Particulate matter	D	All of these are the major pollutant which affects organisms health and causes climate change.



	(b) Carbon dioxide (c) Hydrocarbons (d) All of these		
2567)	PAN is pollutant? (a) Primary (b) Secondary (c) Both of them (d) None of these	B	It is secondary pollutant made from primary air pollutants like uncombustible hydrocarbon, O_3 , NO_2 etc.
2568)	Which of the following is not a pollutant? (a) CO (b) NO_x (c) CH_4 (d) O_2	D	O_2 is not an air pollutant because it is not harmful to human, plant and earth. Also, its concentration not effect the air.
2569)	The mean residence time of methane is (a) 3 – 7 days (b) 3 – 7 months (c) 3 – 7 weeks (d) 3 – 7 years	A	The mean residence time for methane is 3 – 7 days.
2570)	Incinerations may (a) Cause air pollution and acid rain (b) Produce toxic heavy metals (c) Produce toxic ash contents (d) All of the above	D	Incineration of solid waste produces mercury, dioxins, lead and other toxic heavy metals. It also produces pollutant gases and also acid gases, the waste is converted into ash which may be toxic.
2571)	Which one is highly poisonous gas? (a) CO (b) CO_2 (c) O_2 (d) N_2	A	CO sticks to Haemoglobin if inhaled it takes up all the oxygen binding sites forming carboxyhemoglobin which is more stable than the oxygemoglobin complex as result the vital organs like brain, heart etc. do not receive enough oxygen and not work properly.
2572)	Which of the following statements about photochemical smog is wrong? (a) It has high concentration of oxidizing agents. (b) It has low concentration of oxidizing agent (c) It can be controlled by controlling the release of	B	Photochemical smog consists of higher concentration of oxidants like ozone etc thus also called an oxidizing smog.



	NO ₂ , hydrocarbons, ozone etc. (d) Plantation of some plants like pinus helps in controlling photochemical smog.		
2573)	Photochemical smog is the example of (a) Oxidizing smog (b) Reducing smog (c) Strong reducing smog (d) None of these	A	Photochemical smog is oxidizing smog because of higher concentration of oxidants.
2574)	A substance commonly present in car exhaust fan does not pollutes the atmosphere. Which is that (a) SO ₂ (b) CO (c) NO ₂ (d) N ₂	D	N ₂ is not an air pollutant. It is quite inert, prevalent gas in the atmosphere that does not effect animals and plants life. It is also not a greenhouse gas because it does not absorb or emit heat waves.
2575)	Which of the following gases is not a green house gas? (a) CO (b) O ₃ (c) CH ₄ (d) H ₂ O vapour	A	The greenhouse gases are CO ₂ , CH ₄ , CFC, SO _x , HFCF ₃ , halons and some free radicals
2576)	The excessive accumulation of heat and vapors in the atmosphere due to air pollution is (a) Acid rain (b) Green house effect (c) Photochemical smog (d) None of these	B	By definition of green house effect.
2577)	Which set of the following are green house gasses? (a) PAN, CO, N ₂ , O ₂ (b) CH ₄ , CO ₂ , SO _x , NO _x (c) HCl, CO ₂ , N ₂ , O ₂ (d) None of these	B	The green house gases are CO ₂ , CH ₄ , CFC, SO _x and NO _x
2578)	Single radical of chlororine or bromine can deplete into (a) 10 O ₃ molecule (b) 10000 O ₃ molecule (c) 100000 O ₃ molecules (d) 1000000 O ₃ molecule	C	When chlorine or bromine atoms come into contact with ozone in the stratosphere, they destroy ozone molecules one radical of chlorine or bromine destroy over 100,000 ozones molecules before it is removed from



			stosphere.
2579)	Which of the following can deplete ozone layer (a) Nitric oxide (NO) (b) Nitrous oxide (N ₂ O) (c) Sox (d) All of them	D	There are number of species which can cause ozone deflection like CFC _s , IICFC _s , halons, No, NO ₂ hydroxyl and some free radical catalysts, nitroxide radical etc.
2580)	PAN is an irritant to human beings and it affects: (a) Eyes (b) Ears (c) Stomach (d) Nose	A	It increase the rate of eye diseases
2581)	Which one is the best alternative to chlorofluoro carbon? (a) CF ₃ CH ₂ F (b) CHF ₂ Cl (c) CF ₃ CHCl ₂ (d) none of these	A	CFC and HCFC _s refrigerants have damaging effct to the ozone layer so an alternative R134 _a domestic refrigeration and automobile air conditioners.
2582)	The depletion of O ₃ in stratosphere region is mainly due to the reaction of O ₃ with? (a) CO ₂ (b) SO ₂ (c) O ₂ (d) Clorofluoro carbons	D	It is due to the reaction of O ₃ and CFC
2583)	Which of the following cannot cause ozone depletion? (a) CFC ₃ (b) CF ₂ Cl ₂ (c) CClF ₃ (d) CF ₄	D	The CF ₄ cannot cause because it does not belong of CFCs.
2584)	Biochemical oxygen Demand, (BOD) is a measure of organic material present in water. BOD value less than 5 ppm indicates a water sample to be _____. (a) Rich in dissolved oxygen (b) Poor in dissolved oxygen (c) Highly polluted. (d) Not suitable for aquatic life	A	BOD value less than 5 _{ppm} shows that water contain more dissolved oxygen and water is considered to be pure.
2585)	Sewage containing organic waste should not be disposed in water	C	Decrease in the amount of dissolved oxygen which is required for



bodies because it causes major water pollution. Fishes in such a polluted water die because of

- (a) Large number of mosquitoes
- (b) Increase in the amount of dissolved oxygen
- (c) Decreases in the amount of dissolved oxygen in water
- (d) Clogging of gills by mud.

respiration of aquatic organisms like fishes. That is why the fishes die.

2586)	In drinking water, the turbidity should not exceed (a) 10 ppm (b) 15 ppm (c) 20 ppm (d) 30 ppm	A	The turbidity causing agent are suspended solids, dissolved solids, excess of chlorides, sulphates, phosphate etc. thus, the turbidity should not be greater than 10 ppm for drinking water.
2587)	The amount of oxygen consumed as a result of biological oxidation of dissolved organic matter is called: (a) BOD (b) COD (c) DO (d) VOC	A	BOD is the amount of dissolved oxygen required by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time. Low BOD indicates good quality water, High BOD indicates polluted water.
2588)	The effects of radiation pollution are (a) damage to DNA (b) hair loss (c) cancer (d) all	D	All these are the effects of radiation pollution. The effects of accidental and continuous exposure are different.
2589)	Which of the following is/are the radioactive pollutant (a) alpha particles (b) beta particles (c) gamma rays (d) all	D	Radioactive pollutants are those which cause radiation pollution. They are alpha particles, beta particles, gamma rays, neutrons etc.
2590)	The condition where there is damage to the body occurring as a result of large doses of radiation received by the body over a short period of time is called (a) radiation sickness (b) radiation poisoning	D	By definition of radiation sickness. It is also called radiation poisoning or acute radiation syndrome.



	(c) acute radiation syndrome (d) all	
2591)	O_2^+ , NO^+ are found in a. Stratosphere b. Mesosphere c. Thermosphere d. Troposphere	B
2592)	Ozone layer is present in a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere	B
2593)	Aerosol refers to a. Mixture of liquids b. Mixture of gases c. Dispersion of liquid or solids particles in gaseous media d. None of these	C
2594)	Which one of the following is not a fossil fuel a. Coal b. Petroleum c. Natural gas d. H_2	D
2595)	Which one of the following destroys ozone layer a. Freon b. Teflon c. Oxides of nitrogen d. All of the above	D
2596)	The important constituent of photochemical among is a. Ozone b. Pan c. H_2O_2 d. All of the above	B
2597)	Greenhouse effect means a. Rise of temperature in green house b. Global warming c. Melting of glaciers poles d. None of these	B
2598)	Which one of the following oxides	D



does not produces acid rain?

- a. SO_x
- b. NO_x
- c. CO_x
- d. PbO_x

2599) Which parameter is used for D checking the quality of water

- a. BOD
- b. COD
- c. TOC
- d. All of the above

2600) The main pollutant of leather B tanneries in the waste water is due to the salt of

- a. Lead
- b. Chromium
- c. Barium
- d. Potassium

2601) In purification of water the D coagulant used is

- a. NiSO_4
- b. CuSO_4
- c. BaSO_4
- d. Alum

2602) Drained sewage has B.O.D. A (biological biochemical oxygen demand)

- a. More than that of fresh water
- b. Equal to that of fresh water
- c. Less than that a fresh water
- d. None of these

2603) Photochemical smog is primarily D caused by

- a. CO
- b. CO_2
- c. O_3
- d. NO_2

2604) Result of ozone hole is D

- a. Acid rains
- b. Global warming
- c. Increased amount of CO_2
- d. exposure of U.V light

2605) Which one of the following D



substance is not present in acid rain?

- a. H_2SO_4
- b. HNO_3
- c. H_2SO_4
- d. CH_3COOH

2606) Photochemical smog PAN is D
formed by

- a. The action of oxides of nitrogen on hydrocarbons in the presence of sunlight
- b. Action of carbon dioxide on hydrocarbon in presence of sunlight
- c. Action of hydrogen sulphide on hydrocarbon in presence of sunlight
- d. Action of SO_2 and hydrocarbons

2607)

CHAPTER 24

ANALYTICAL CHEMISTRY

2608) Choose the correct arrangement of the various regions of the electromagnetic spectrum in terms of wave length
A. IR > UV Visible > Microwave > Radio wave
B. Microwave > IR > Visible > UV > Radio
C) Radio wave > Microwave > IR > Visible > UV
D) Visible > IR > UV > Microwave > Radio

C

2609) Which electronic transition is associated with propanol by absorbing uv/visible radiation?

- A) $n \rightarrow \sigma^*$
- B) $n \rightarrow \pi^*$
- C) $n \rightarrow \pi$
- D) $\sigma \rightarrow \sigma^*$

C

2610) The nuclei you think is invisible in A



NMR spectroscopy is:

- A) N^{14} B) P^{31}
C) C^{35} D) C^{13}

2611) The empirical formula of the compound was found to be CH_2O . If the molar mass of the compound is 150g/mol. The molecular formula of the compound is:

D

- A) $C_6H_{12}O_6$ B) $C_4H_8O_2$
C) $C_5H_{10}O_4$ D) $C_5H_{10}O_5$

2612) Molar extinction coefficient (ϵ) a constant in Beer-Lambert law is the characteristics of the:

A

- A) Solute B) Solvent
C) concentration D) All of the above

2613) Which region of electromagnetic spectrum is involved in nuclear magnetic resonance (NMR spectroscopy)?

C

- A) Micro wave B) Radio wave
C) Infrared region D) X-rays

2614) The electronic transition that is involved in the visible region is:

B

- A) $\sigma - \sigma$ B) $d - d$
C) $\pi - \pi$ D) $\pi - \sigma$

2615) Choose the correct Statement:

A

- (a) The most direct and accurate method for determining atomic masses uses mass spectroscopy.
(b) The indirect but accurate method for determining molecular masses uses mass spectroscopy.
(c) Collision between the electrons and the atoms produces negative ions by absorption of electrons by atoms or molecules.
(d) The first application of the mass spectroscopy was the demonstration to detect various isotopes of Argon.

2616) A sample containing aluminum **B** %age of an Element =



weighing 10.0g yielded 2.0g of aluminum sulphide. What is the percentage of aluminum (atomic mass = 27.0) in the sample?

Sulphur (atomic mass = 32.0)

(a) $\frac{2.0 \times 100}{10.0}$ (b)

$\frac{2.0}{10} \times \frac{2 \times 27}{150} \times 100$

(c) $\frac{2.0}{10.0} \times \frac{27}{1500} \times 100$ (d)

$\frac{2.0}{10.0} \times \frac{150}{3 \times 27} \times 100$

$$\frac{\text{Given Mass of Al} \times \text{Af. Mass}}{\text{Given Mass of organic Compound} \times \frac{\# \text{ of atoms} \times \text{M. Mass of Al}}{\text{M. Mass of organic Compound}}} \times 100 =$$

$$\frac{2.0}{10.0} \times \frac{2 \times 27}{150} \times 100$$

2617) Natural chlorine occurs as a mixture of isotopes if a mixture contains 75% Cl^{35} and 25% Cl^{37} what will be its correct atomic weight?

(a) 35.50 (b) 34.50

(c) 72.00 (d) 70.00

Amount of $\text{Cl}^{35} = \frac{75}{100} = 0.75$

Amount of $\text{Cl}^{37} = \frac{25}{100} = 0.25$

Average atomic weight = (Amount) (At: Mass of 1st Isotope) + (Amount) (At mass of 2nd Isotope)
 $= (0.75) (35) + (0.25) (37) = 26.25 + 9.25 = 35.5$

2618) The atoms of an element having same atomic number but different mass number are called.

(a) Isotones (b)

Isotopes

(c) Isobars (d) Isomers

2619) Benzene molecule have six carbon atoms and six hydrogen atoms the NMR spectrum of benzene will show:

(a) 12-peaks (b) 6-peaks

(c) 3-peaks (d) Only a single peak

2620) The functional group region in infra-red spectrum lies between:

(a) $500 - 1300\text{cm}^{-1}$ (b) $600 - 1500\text{cm}^{-1}$

(c) $1500 - 4000\text{cm}^{-1}$ (d) $2500 - 3500\text{cm}^{-1}$

2621) Chemical shift in NMR spectroscopy is expressed as delta (δ) or tau (τ) scale. Choose the correct relationship between δ and



t:

(a) $\delta = 10 - t$ (b) $\delta = 10 + t$

(c) $t = \delta - 10$ (d) $t = 10 - \delta$

2622)	The water for Med] in the combustion analysis is usually absorbed by: (a) $\text{Mg}(\text{NO}_3)_2$ (b) $\text{Mg}(\text{ClO}_4)_2$ (c) $\text{Mg}(\text{OH})_2$ (d) $\text{Mg}(\text{ClO}_2)_2$	B	
2623)	The infrared spectra commonly referred to as IR spectra is usually expressed as: (a) Wave lEng]th (b) Wave number (c) Frequency (d) All of the above	A	
2624)	The electronic transition that is involved in the visible region is: (a) $\sigma - \sigma$ (b) $d - d$ (c) $\pi - \pi$ (d) $\pi - \sigma$	B	
2625)	Tetramethylsilane (TMS) is added to the compound as standard while carrying out its NMR spectra the TMS is a: (a) Nonvolatile compound (b) Less volatile compound (c) Highly volatile compound (d) Highly reactive compound	C	
2626)	100% transmission in IR spectroscopy means: A) No absorption B) 50% absorption C) 75% absorption D) 100% absorption	A	
2627)	A sample containing aluminum weighing 10.0g, yielded 2.0g of aluminum sulphide. What is the percentage of aluminum (atomic mass = 27) in the sample?	B	$\% \text{ of Al} = \frac{\text{weight of Al}_2\text{S}_3}{\text{weight of sample}} \times \frac{\text{No. of Atom} \times \text{Atomic m.}}{\text{molar mass of Al}}$ $\% \text{ of al} = \frac{2g}{10} \times \frac{2 \times 27g}{150g} \times 100$



- (a) $\frac{2 \times 100}{10}$
 (b) $\frac{2.0}{10} \times \frac{2 \times 27}{150} \times 100$
 (c) $\frac{2}{10} \times \frac{1500}{27} \times 100$
 (d) $\frac{2}{10} \times \frac{150}{3 \times 27} \times 100$

2628)	In combustion analysis carbon dioxide is absorbed by (a) $Mg(ClO_4)_2$ (b) KOH (c) CuO (d) $CuSO_4$	B	The CO_2 and H_2O are drawn into two tubes. One tube contains $Mg(ClO_4)_2$ that absorb water and other tubes contain KOH that absorb CO_2 .
2629)	Lassaigne's is used for the detection of (a) Nitrogen (b) Hydrogen (c) Carbon (d) All of these	A	Carbon and hydrogen is detect by combustion analysis and nitrogen is detected by Lassaign's test or sodium fusion test.
2630)	Combustion analysis is (a) Qualitative (b) Quantitative (c) Both of them (d) None of them	B	How much quantity of H_2O and CO_2 is absorbed in $Mg(ClO_4)_2$ and KOH tube. We weight these tubes before and after the combustion. So it is a quantitative analysis.
2631)	which one is desiccating agent? (a) $Mg(ClO_4)_2$ (b) P_2O_5 (c) Silica gel (d) All of them	D	All absorb moisture H_2O that is why all are desiccating agent.
2632)	Which one of the following cannot be analysed directly by combustion analysis? (a) Oxygen (b) Carbon (c) Hydrogen (d) All of these	A	Oxygen is not analyzed directly by combustion analysis. It %age can be found indirectly are % age of oxygen = $100 - \% \text{ age of C} + \% \text{ age of H}$
2633)	Salt analysis is the example of: (a) Qualitative analysis (b) Quantitative analysis (c) Combustion analysis (d) All of them	A	Salt analysis is a qualitative analysis. It is the identification of cations and anion present in a salt or a mixture of salt.
2634)	Modern methods of analysis are superior to classical one because; (a) They give more accurate	D	Any modern method like spectroscopic method which gives correct information about the



	results (b) Small amounts of chemicals are used (c) Less time consuming (d) All of the above		structure of a compound it is less time consuming and small quantity is sufficient for analysis of the analyte. .
2635)	Which is not electromagnetic radiation? (a) X-Rays (b) U.V (c) Cathode ray (d) None of these	C	Cathode rays has negative charge and mass, while E.M.R is chargeless and massless.
2636)	Which of the following radiations have longer wavelength; (a) X-Rays (b) Radio waves (c) Visible (d) UV	B	Longer wavelength order Radio wave > micro wave > infrared > visible > UV > X-rays > Gamma rays > Cosmic rays
2637)	Which of the following radiations have greater frequency (a) X-Rays (b) Radio waves (c) Visible (d) UV	A	High frequency order Cosmic rays > gama rays > X-Rays > UV > Visible > infrared > microwaves > radio waves
2638)	Which one is electromagnetic radiations? (a) X-Rays (b) Vibgyor (c) Radio waves (d) All of them	D	E.M.R has no charge mass. All are EMR.
2639)	Mass spectrometry works on the principle: (a) Charge to mass ratio (b) Mass to charge ratio (c) Mass to mass ratio (d) Charge to charge ratio	A	In mass spectrometry ions are produced from atoms and molecules. Its principle is based on charge to mass ratio (e/m) of the ions.
2640)	Which of the following transition need high energy (a) $\pi \rightarrow \pi^*$ (b) $\delta \rightarrow \pi^*$ (c) $\delta \rightarrow \delta^*$ (d) $n \rightarrow \pi^*$	C	The energy required for $\sigma - \sigma^*$ transition is very high occur in the vacuum UV region.
2641)	The possible transition in ethane is: (a) $\pi \rightarrow \pi^*$	C	Ethane ($\text{CH}_3 - \text{CH}_3$) has neither π bond nor unshared electrons. It has



(b) $\delta \rightarrow \pi^*$

(c) $\delta \rightarrow \delta^*$

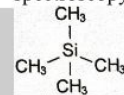
(d) $n \rightarrow \pi^*$

only σ bond thus only $\sigma - \sigma^*$ transition is possible in ethane.

- 2642)** Which of the following technique is used to determine unsaturation in a compound:
(a) UV spectroscopy
(b) Mass spectrometry
(c) NMR
(d) Combustion analysis
- 2643)** The number of peaks obtained for tetramethyl silane in ^1H NMR spectroscopy.
(a) Single
(b) Double
(c) Triplet
(d) All
- 2644)** The portion of the electromagnetic radiation used in NMR is:
(a) IR
(b) Radiowave
(c) UV – visible
(d) Microwave
- 2645)** Copper (II) oxide is mixed with a organic compound during combustion analysis. The purpose is
a. To carry out complete combustion
b. To reduce the economy of the process
c. To reduce the time for completion of the reaction
d. All of the above
- 2646)** Which of the following elements a

UV spectroscopy helps to determine unsaturation. If a compound has π bond then $\pi - \pi^*$ transition will be possible in that compound. If no π bond then no $\pi - \pi^*$ transitions will occur.

In TMS all the protons have same environment. It will give a single peak. All protons in each methyl group is attached to silicon. We also used TMS as a reference in ^1H NMR spectroscopy.



Give a single peak.

The absorption of electromagnetic radiation by a nucleus to induced spin-flipping will take place when the frequency of EMR is exactly equal to the precession frequency of the nucleus. The precession frequency is also called lamor frequency. The lamor frequency of all the atomic isotopes lie almost in the radio frequency region that is why is NMR radio waves are used.



present in compound cannot be determined by combustion analysis

- a. Oxygen
- b. Hydrogen
- c. Carbon
- d. None of the above

2647) A compound contains 10% a phosphorus. If atomic mass of phosphorus is 31, the molecular mass of the compound having one phosphorus atom per molecule is

- a. 310
- b. 31×10^2
- c. 31×10^4
- d. 31×10^3

2648) Which one of the following is b quantitative chemical analysis?

- a. Salt analysis
- b. Titration
- c. Flame test
- d. Borax bead test

2649) C_2H_6O is the molecular formula is c
(1) Ethanol (2) Methanol
(3) Dimethyl ether (d) Diethyl ether

- a. 1 and 2
- b. 2 and 3
- c. 1 and 3
- d. 2 and 4

2650) Which one of the following a technique is used for determination of functional group in a compound

- a. IR spectroscopy
- b. NMR
- c. UV
- d. Mass spectrometry

2651) Two different compounds will give a different absorption peaks in _____ region.

- a. $600-1500\text{cm}^{-1}$
- b. $1500-4000\text{cm}^{-1}$
- c. $3000-2500\text{cm}^{-1}$
- d. $2500-3500\text{cm}^{-1}$



2652) Which one of the following techniques would be best for finding the functional groups in an organic compound?

- a. Mass spectrometry
- b. NMR spectrophotometry
- c. IR spectrophotometry
- d. UV spectrophotometry

2653) The correct order for the basic feature of a mass spectrometer is...

- a. Acceleration, deflection, detection, ionization
- b. Ionization, acceleration, deflection, detection
- c. Acceleration, ionization, deflection, detection
- d. Acceleration, deflection, ionization, detection

2654) Which one of the following statements about ionization in mass spectrometer is incorrect?

- a. Gaseous atoms are ionized by bombarding them with high energy electrons
- b. Atoms are ionized so they can be accelerated
- c. Atoms are ionized so they can be deflected
- d. It doesn't matter how much energy you use to ionize the atom

2655) The path of ions after deflection depends on...

- a. Only the mass of the ion
- b. Only the charge on the ion
- c. Both the charge and the mass of the ion
- d. Neither the charge nor the mass of the ion

2656) Which one of the following pieces of information cannot be obtained from an infra-red spectrum?

- a. The molecular mass



- b. The presence of C=O bonds
- c. The presence of O-H bonds
- d. The identity of a compound through comparison with other spectra

2657) Proton NMR is useful for investigating the structure of organic compounds because.

- a. Organic compounds contain carbon atoms
- b. Organic compounds are mostly covalent
- c. Hydrogen atoms are found in nearly all organic compounds
- d. Organic compounds have low boiling points

2658) Which of the following statements about tetramethylsilane is incorrect?

- a. It produces a single peak at $\delta = 10$
- b. It is inert
- c. It is volatile and can be easily distilled off and used again
- d. It is used to provide a reference against which other peaks are measured

2659) Signals in a proton NMR spectrum do not provide information about...

- a. The relative number of hydrogen atoms in a particular environment
- b. The number of chemically different hydrogen atoms on adjacent atoms
- c. The environment of different hydrogen atoms in a molecule
- d. The molecular mass of an organic molecule

2660) To work out the molecular mass of an organic molecule you would look at its.

- a. Infra red spectrum



- b. Mass spectrum
- c. Proton nmr spectrum
- d. Boiling point

2661) Which one of the following methods would be best for finding the different types of groups in an organic compounds?

- a. Finding the m/z value of the molecular ion in its mass spectrum
- b. Its proton NMR spectrum
- c. Comparing its infra-red spectrum with known examples
- d. Measuring its melting point

2662) What does the notation $n \rightarrow g^*$ a means?

- a. Absorption; transition from a non-bonding MO to g^* MO.
- b. Absorption; transition from a quantum level n to r^* MO.
- c. Emission; transition from a quantum level n to g^* MO.
- d. Emission; transition from a non-bonding MO to r^* MO.

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